CH2MHILL

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16 April 2006

Mr. Carl Goldstein
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P.O. Box 368A
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Enclosed is one report containing the May 2006 supplementary effluent bioassay test results and the required November 2006 Tradewind effluent bioassay test results for the Joint Cannery Outfall in American Samoa. The sampling and analysis for both sampling events were carried out without problems. The results are similar to the past bioassay test results.

Please call us if you have any questions or comments on the enclosed report.

Sincerely,

Karen A. Glatzel

Karen A. Glatzel

Cc: Jim Cox, COS International; Willem Martines, COS; Jim McCloud, COS; Brett Butler, StarKist Samoa; Joe Carney, StarKist Samoa; Tim Ruby, Del Monte; David Wilson, CH2M HILL.

Encl: Bioassay Testing – Joint Cannery Outfall Effluent May 2006 Supplementary Sampling and November 2006 Tradewind Season Sampling

SAMOA JOINT CANNERY OUTFALL

2006 Supplementary
and
2006 Tradewind Season

EFFLUENT BIOASSAY TEST RESULTS

May 2006 Sampling
and
November 2006 Sampling

4 April 2007

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TECHNICAL MEMORANDUM

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BIOASSAY TESTING – JOINT CANNERY OUTFALL EFFLUENT SUPPLEMENTARY MAY 2006 SAMPLING AND REGULAR NOVEMBER 2006 SAMPLING

Prepared For: StarKist Samoa (NPDES Permit AS0000019)
COS Samoa Packing (NPDES Permit AS0000027)

Prepared By: Steve Costa
Karen Glatzel

Date: 4 April 2007

Distribution: Carl Goldstein
United States Environmental Protection Agency, Region 9
Peter Peshut
American Samoa Environmental Protection Agency

Purpose

This memorandum presents the results of the supplementary bioassay testing of the Joint Cannery Outfall effluent sample that was collected in May 2006 and the regular semi-annual effluent sampling of November 2006[1]. The testing is required by the NPDES Permits that became effective in January 2001. The supplementary sampling in May 2006 was collected because of laboratory errors that occurred in the previous March 2006 test. The November 2006 sampling is the twelfth required semi-annual test required by the current permits. The May 2006 is the twenty-eighth test and the November 2006 is the twenty-ninth test conducted since toxicity testing of the Joint Cannery Outfall effluent began in 1993[2].

Study Objectives

Section D.1 of the StarKist Samoa and COS Samoa Packing NPDES Permits requires that semiannual definitive acute bioassays (96-hour static bioassays) be conducted on the cannery effluent. The purpose of these tests is to determine whether, and at

[1] The semi-annual joint cannery outfall effluent bioassay tests are performed during the Non-Tradewind and Tradewind oceanographic seasons.

[2] Testing was not conducted during 1999. Extra tests using two organisms were conducted in March 1995 and February 1996.

what effluent concentration, acute toxicity may be detected for the combined joint cannery effluent discharge into Pago Pago Harbor.

Study Approach

The U.S. Environmental Protection Agency (USEPA) has conducted a number of reviews of the effluent sampling, analysis, and bioassay tests conducted in the past. All comments from (USEPA have been incorporated into the sampling and sample handling standard operating procedures (SOP) or have been incorporated into the procedures used by the laboratory doing the test. The comments, responses, and SOP have been documented in previous reports.

The NPDES permit conditions require that the bioassay tests be conducted with the white shrimp, *Penaeus vannami* (postlarvae). In the event *Penaeus vannami* is not available at the time of the tests, the permit specifies the substitute species, *Mysidopsis bahia*, which now has been renamed *Americamysis bahia*. For the May and November 2006 samplings, *Penaeus vannami* was not available and *Americamysis bahia* was used.

Effluent samples were collected from the StarKist Samoa and COS Samoa Packing facilities as 24-hour composite samples. The acute effluent bioassay test was conducted using a combined, flow-weighted, composite effluent sample made up from the effluent samples from both canneries, as allowed by the NPDES permit condition. This combined effluent bioassay is representative of the wastewater discharged from the joint cannery outfall to Pago Pago Harbor.

Effluent Sampling Methods

The May 2006 effluent sample was collected between 09:00 on 24 May 2006 and 06:00 on 25 May 2006. The November 2006 effluent sample was collected between 09:00 on 7 November 2006 and 06:00 on 8 November 2006. For both tests a 24-hour flow-weighted composite sample of final effluent was collected from both the StarKist Samoa and COS Samoa Packing effluent discharges. Samples were collected from the established effluent sampling sites. Detailed sampling procedures are described in the established SOP for cannery effluent sampling.

A total of eight grab samples were collected into 1-gallon plastic cubitainers at each cannery for each sampling. Samples were collected at approximately three-hour intervals over the 24-hour period. The samples were stored on ice or in a refrigerator until the completion of the 24-hour sampling period. After all samples were collected a 5-gallon flow-proportioned composite sample was prepared. The grab sample collection times, effluent flow rates, and the relative effluent flow

volumes calculated from plant flow records are summarized in Table 1 for the May 2006 supplementary sampling and in Table 2 for the regular November 2006 sampling. The relative effluent flow volumes were used to prepare the final composite sample, which was used to fill the sample container shipped to the laboratory for testing.

A 5-gallon cubitainer containing the composite sample was packed on ice in an ice chest for shipment to the laboratory. A chain-of-custody form for the sample was completed and sealed into a zip-lock bag and taped inside the lid of the ice chest. The sample was shipped via DHL to the testing laboratory. The chain-of-custody forms and the DHL waybills for each of the tests are provided in Attachment I.

Table 1
StarKist Samoa and COS Samoa Packing
24-hour Composite Effluent Sample for Bioassay Testing
May 2006 – Supplementary Sample

Grab Sample Number	COS Samoa Packing		StarKist Samoa		COS Samoa Packing Percent of Total Flow	StarKist Samoa Percent Of Total Flow
	Sampling Date and Time	Effluent Flow Rate (mgd)	Sampling Date and Time	Effluent Flow Rate (mgd)		
24 May 2006						
1	09:00	0.88	09:00	1.7683	3.4	6.9
2	12:00	0.84	12:00	2.8829	3.3	11.2
3	15:00	0.68	15:00	2.4480	2.6	9.5
4	18:00	0.78	18:00	2.6626	3.0	10.4
5	21:00	0.98	21:00	2.3947	3.8	9.3
25 May 2006						
6	00:00	0.68	00:00	2.7216	2.6	10.6
7	03:00	0.68	03:00	2.2118	2.6	8.6
8	06:00	0.88	06:00	2.4221	2.5	9.4
Total		6.16 [A]		19.51 [A]	24.0%	76.0%
Mean		0.77		2.44	Total = 100%	

[A] Numerical total of column for calculation purposes. Total flow over period will be approximately the calculated mean.

Table 2
StarKist Samoa and COS Samoa Packing
24-hour Composite Effluent Sample for Bioassay Testing
November 2006 Sample

Grab Sample Number	COS Samoa Packing		StarKist Samoa		COS Samoa Packing Percent of Total Flow	StarKist Samoa Percent Of Total Flow
	Sampling Date and Time	Effluent Flow Rate (mgd)	Sampling Date and Time	Effluent Flow Rate (mgd)		
7 November 2006						
1	09:00	0.72	09:00	2.03	2.86	8.06
2	12:00	0.72	12:00	2.12	2.86	8.42
3	15:00	0.74	15:00	2.22	2.94	8.81
4	18:00	0.74	18:00	2.76	2.94	10.96
5	21:00	0.74	21:00	2.59	2.94	10.28
8 November 2006						
6	00:00	0.80	00:00	2.40	3.18	9.53
7	03:00	0.80	03:00	2.41	3.18	9.57
8	06:00	0.80	06:00	2.60	3.18	
Total		6.06 [A]		19.13 [A]	24.1%	75.9%
Mean		0.76		2.39	Total = 100%	

[A] Numerical total of column for calculation purposes. Total flow over period will be approximately the calculated mean.

Bioassay Testing Procedures

EnviroSystems, Inc. located in Hampton, New Hampshire conducted the bioassay tests. The testing procedures and results of the bioassay tests are provided in the laboratory report included as Attachment II for the May 2006 sampling and Attachment III for the November 2006 sampling. This report summarizes the 96-hour acute bioassay tests conducted with reference to the (USEPA) document Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms (EPA-821-R-02-012), 2002 as the source of methods for conducting the test. The bioassay tests were conducted considering and including USEPA's comments on previous bioassay tests, as documented in previous reports.

For both tests the test organisms were ≤ 5 days old and the test temperature was to be held at a nominal 20 °C. For the May 2006 sampling the actual temperatures ranged between 19°C and 21°C and for the November 2006 tests the temperature remained constant at 20°C. Salinity was adjusted to 25 ppt at the start of both of the

tests and ranged during the May 2006 test between 24 and 28 ppt. During the November 2006 test the salinity ranged between 25 and 30 ppt.

Demonstrated potential for a lethal immediate dissolved oxygen demand (IDOD) and a delayed dissolved oxygen demand spike (DDOD) had been discussed and documented in previous technical memoranda, which describe the first two tests conducted in 1993. Therefore, all of the bioassay test chambers should have been continuously aerated during the bioassay tests to maintain adequate levels of dissolved oxygen (DO)[3]. The test should also be renewed with pre-oxygenated effluent sample at 48 hours. However, for May 2006 sampling the laboratory failed to follow these procedures during this test and the DO went to lethally low levels in the higher effluent concentrations within the twenty-four hours of the test at the 75% and 100% concentration levels. (See the Laboratory Report in Attachment II.). This same error had occurred during the March 2006 test and was the primary reason for conducting the May 2006 supplementary test[4].

Because of the low DO levels the toxicity of the May 2006 effluent could not be determined. The apparent toxicity caused by the low DO levels is higher than the actual toxicity. Since the results of the test show that the apparent toxicity (although masked by low DO levels) is still reduced to acceptable levels well within the ZID, the results of the test are being reported below.

Bioassay tests were carried out for effluent concentrations of 100, 75, 50, 25, 12.5, and 6.25 percent as vol: vol dilutions in seawater. Water quality was monitored daily and parameters measured included DO, pH, salinity, and temperature. Total residual chlorine and ammonia were also measured. Water quality data are provided in the Laboratory Report (Attachment II and III). Reference toxicant tests using sodium dodecyl sulfonate (SDS) are conducted regularly by ESI with the relevant tests completed on 30 May 2006 and on 06 November 2006 for which the results were within the acceptable range based on the 20 most recent laboratory reference toxicant tests.

[3] The high initial dilution of the actual effluent discharge (>100:1) into the Harbor, in a very short time, eliminates any concern about IDOD effects in the receiving water.

[4] During the March 2006 test the renewal water was not aerated causing the DO to go to lethal levels in one of the 50% effluent chambers and all of the 75% and 100% effluent concentration chambers.

Summary Results: Americamysis bahia Effluent Bioassay

The results for the May 2006 bioassay tests are included in Attachment II, and the results of the November 2006 tests are included in Attachment III. The results for the May 2006 mysid bioassay tests indicate the 96-hour LC_{50} for the effluent tested was 32.7% percent. The no observable effects concentration (NOEC) for the 96-hour bioassay was 12.5 percent and the least observable effects concentration (LOEC) was 25 percent. Results on a daily basis are summarized in Table 3.

The results for the November 2006 mysid bioassay tests indicate the 96-hour LC_{50} for the effluent tested was 43.1% percent. The no observable effects concentration (NOEC) for the 96-hour bioassay was 25 percent and the least observable effects concentration (LOEC) was 50 percent. Results on a daily basis are summarized in Table 4.

Table 3
StarKist Samoa and COS Samoa Packing
Combined Effluent Bioassay Results
May 2006 Supplementary Sampling

Exposure Time	Parameter		
	LC_{50}	NOEC	LOEC
24 hours	>50.4%	25%	50%
48 hours	>43.2%	25%	50%
72 hours	>42.7%	25%	50%
96 hours	>32.7%	12.5%	25%

Table 4
StarKist Samoa and COS Samoa Packing
Combined Effluent Bioassay Results
November 2006 Sampling

Exposure Time	Parameter		
	LC_{50}	NOEC	LOEC
24 hours	>55.1%	50%	75%
48 hours	>51.9%	50%	75%
72 hours	>50.5%	50%	75%
96 hours	>43.1%	25%	50%

Discussion

Table 5 summarizes the results of the effluent bioassay tests for the samples collected in the May 2006 and November 2006 sampling compared to the previous bioassay tests. The LC_{50}, NOEC, and LOEC are within the range obtained from

previous tests where *Americamysis bahia* (*Mysidopsis bahia*) was used in place of *Penaeus vannami*. Figure 1 summarizes the LC_{50} for the mysid and penaeid tests done since February 1993. Figure 2 presents the range of LC_{50} results for mysids tests conducted since 1994. There is some variability observed in test results. The May 2006 test results are among the highest LC_{50} values recorded for this organism, but because of the DO problems during the test results are lower than the results from the last 2½ years. During the November 2006 bioassay test the laboratory followed the correct protocol and the results was a test with one of the highest. Higher LC_{50} values indicate lower whole effluent toxicity. There is a possible trend toward lower toxicity (higher LC_{50}) with time (see Figure 2).

Conclusions

The bioassay tests for the Joint Cannery Outfall effluent for May 2006 do not indicate effluent toxicity levels to be of concern. As discussed in the previous bioassay test reports on the effluent, the time scale of the mixing of the effluent with the receiving water is on the order of seconds to achieve dilutions that will eliminate possible toxic effects as reflected by the bioassay results. For example, an LC_{50} of 32.7 percent after 96 hours of exposure, which was observed in May 2006, corresponds to a dilution factor of 3.1:1, which is achieved within one second and within one meter of the discharge point. The discharge is located in about 180 feet of water and the effluent toxicity tests indicate that the discharge is diluted to non-toxic levels immediately after discharge and well within the initial dilution plume.

For the May 2006 test the LC_{50} of 32.7 percent corresponds to 3.06 acute toxicity units (TU_a). A dilution of less than 10:1 will reduce the toxicity to less than 0.3 TU_a, which is considered the acceptable level for the protection of aquatic life. The JCO achieves an initial dilution, under critical conditions of greater than 300:1. Therefore, at the edge of the zone of initial dilution (ZID) the acute toxicity is 1.02 TU_a for the LC_{50} documented in the May 2006 test. Since the test appears to be compromised by low DO depressions during the test the actual toxicity at the edge of the ZID is expected be even lower.

For the November 2006 test the LC_{50} was 43.1 percent, which corresponds to a dilution factor of 2.3:1. This dilution is achieved within 1 second and within one meter of the discharge point. The November 2006 LC_{50} of 43.1 percent corresponds to a TU_a of 2.32, which is considered the acceptable level for the protection of aquatic life. The JCO achieves an initial dilution, under critical conditions of greater than 300:1. Therefore, at the edge of the zone of initial dilution (ZID) the acute toxicity is 0.77 TU_a for the LC_{50} documented in the November 2006 test.

Table 5
StarKist Samoa and COS Samoa Packing
Combined Effluent Bioassay Results

Date	*Species*	Parameters		
		LC_{50}	NOEC	LOEC
2/93	*Penaeus vannami*	4.8%[1]	3.1%	6.25%
10/93	*Penaeus vannami*	15.67%	3.1%	6.25%
2/94	*Penaeus vannami*	15.76%	<1.6%	1.6%
10/94	*Mysidopsis bahia*[2]	31.2%	25%	50%
3/95	*Penaeus vannami*	14.8%	6.25%	12.5%
3/95	*Mysidopsis bahia*[3]	10.8%	6.25%	12.5%
2/96	*Penaeus vannami*	>50%	>50%	>50%
2/96	*Mysidopsis bahia*[3]	28.36%	12.5%	25%
3/96	*Penaeus vannami*	44.4%	25%	50%
11/96	*Penaeus vannami*	7.11%	3.1%	6.25%
03/97	*Penaeus vannami*	39.36%	12.5%	25%
09/97	*Penaeus vannami*[4]	12.3%	6.25%	12.5%
06/98	*Mysidopsis bahia*[2]	17.2%	6.25%	12.5%
11/98	*Mysidopsis bahia*[2]	15%	6.25%	12.5%
02/00	*Mysidopsis bahia*[2]	20%	6.25%	12.5%
08/00	*Mysidopsis bahia*[2]	17.1%	3.1%	6.25%
03/01	*Americamysis bahia*[2,5]	13.8%	12.5%	25%
10/01	*Americamysis bahia*[2,6]	37.5%	25%	50%
3/02	*Americamysis bahia*[2,6]	16.1%	12.5%	25%
8/02	*Americamysis bahia*[2,6]	10.23%	6.25%	12.5%
03/03	*Americamysis bahia*[2,6]	28.4%	25%	50%
08/03	*Americamysis bahia*[2,6]	43.2%	25%	50%
02/04	*Americamysis bahia*[2,6]	>50%	50%	>50%
09/04	*Americamysis bahia*[2,6]	>50%	50%	>50%
03/05	*Americamysis bahia*[2,6]	48.5%	25%	50%
08/05	*Americamysis bahia*[2,6]	>50%	50%	>50%
03/06	*Americamysis bahia*[2,6]	35.6%[7]	25%	50%
05/06	*Americamysis bahia*[2,6]	**32.7%**[7]	**12.5%**	**25%**
11/06	*Americamysis bahia*[2,6]	**43.1%**	**25%**	**50%**

[1] The February 1993 samples were not aerated until after the first day of the test. For subsequent tests the samples were aerated for the entire duration of the tests.
[2] *Mysidopsis bahia* used as substitutes because *Penaeus vannami* not available: as directed and approved by USEPA.
[3] *Mysidopsis bahia* used in addition to *Penaeus vannami* as described in text of technical memorandums reporting test results. Only one species is required by the permit conditions.
[4] Stage 1 (3 mm) *Penaeus vannami* were used for testing because older Stage 7 and 8 (8-10 mm) *Penaeus vannami* were not available.
[5] *Mysidopsis bahia* renamed *Americamysis bahia*. Results indicate increased toxicity because of low DO in renewal concentrations as renewal water was not aerated prior to use
[6] *Mysidopsis bahia* renamed *Americamysis bahia*
[7] Results for this test depressed because aeration was not provided (see text).

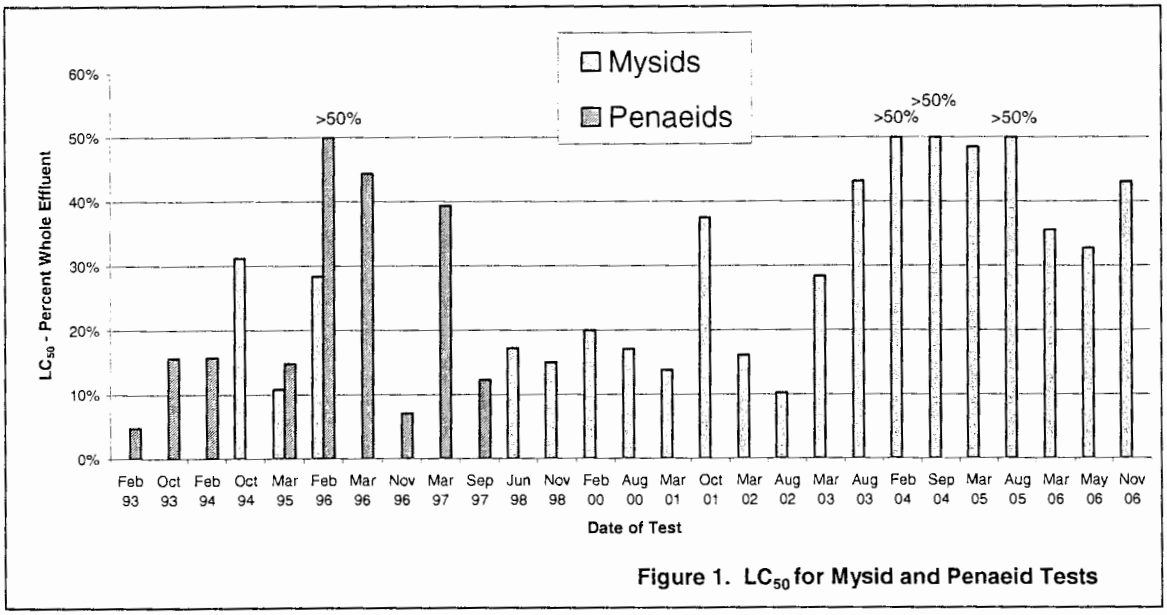

Figure 1. LC_{50} for Mysid and Penaeid Tests

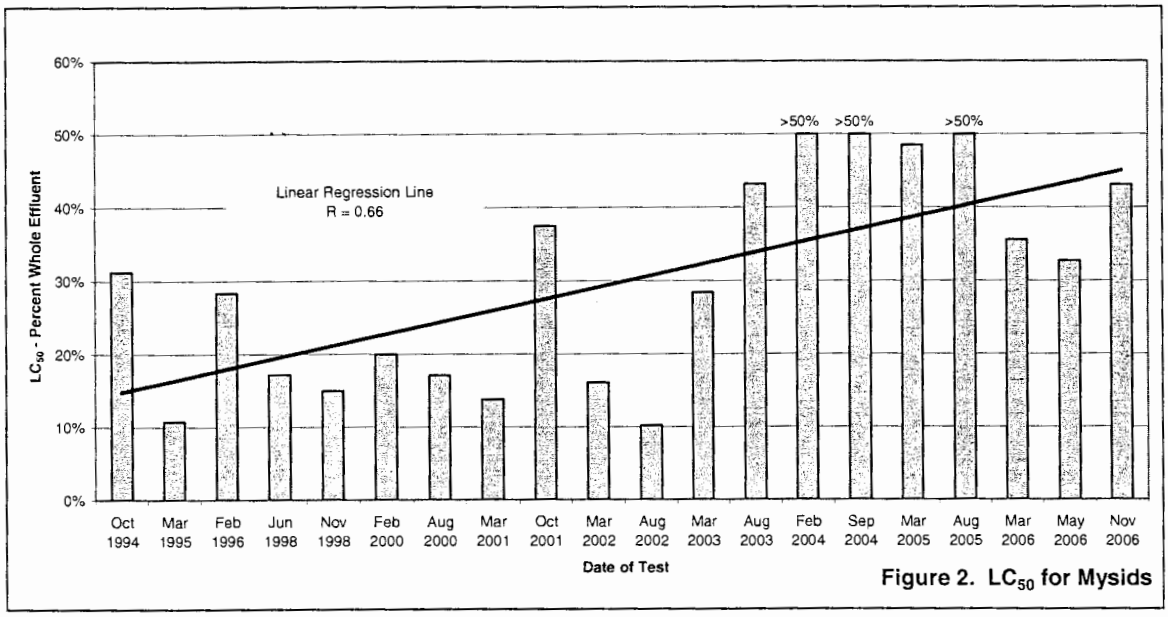

Figure 2. LC_{50} for Mysids

ATTACHMENT I

Chain-of-Custody

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APPLIED SCIENCES LABORATORY

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M Hill Project # 147323.JC.06.NT

Purchase Order #

Project Name: SAMOA JOINT CANNERY OUTFALL

Company Name/CH2M HILL Office: CH2M HILL / PO BOX 1238 / TRINIDAD, CA 95570

Project Manager & Phone #: Mr. [ ] STEVE COSTA; Ms. [ ]; Dr. [ ] 707-677-0123

Report Copy to:

Requested Completion Date:

Sampling Requirements: SDWA [ ] NPDES [ ] RCRA [ ] OTHER ____

Sample Disposal: Dispose [ ] Return [ ]

LAB TEST CODES

SHADED AREA - FOR LAB USE ONLY

Lab 1 #: Lab 2 #:

Quote #: Kit Request #:

Project #:

No. of Samples: Page 1 of 1

Login: LIMS Ver.:

REMARKS: LAB 1 ID: LAB 2 ID:

ANALYSES REQUESTED

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	M/SIO 96-HR ALIVE BIOASSAY
5/25/06		X		X			JC0606SUPP	1	X

Sampled By & Time: (Please sign and print name) — Date/Time: 5/25/06

Relinquished By: (Please sign and print name) — Date/Time: 5/25/06

QC Level: 1 2 3 Other

Received By: DHL (Please sign and print name) — Date/Time:

Relinquished By: DHL (Please sign and print name) — Date/Time:

COC Rec'd: ICE:

Received By: (Please sign and print name) — Date/Time: 5/31/06 1215

Relinquished By: (Please sign and print name) — Date/Time:

Ana Req: TEMP:

Cust Seal: Ph:

Received By: (Please sign and print name) — Date/Time:

Shipped Via: UPS BUS Fed-Ex Hand Other DHL — Shipping #:

Work Authorized By: (Please sign and print name)

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☐ **Yes** *Declared Value for Carriage (in US $)* _____

2 From (Shipper)

Shipper's Account Number	Contact Name
	JOE CARMEN

Shipper's Reference *(up to 35 characters)*: 147323.JC.00.NT

Company Name: SMOKIN SAMOA

Address: P.O. BOX 368
PAGO PAGO
AMERICAN SAMOA

Post/ZIP Code (required)	Phone, Fax, or E-mail (required)
96799	684-644-4231

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Company Name: ENVIRO SYSTEMS INC

Contact Person: BRIAN BUZBY

Delivery Address *DHL Cannot Deliver to a PO Box*: 6 NE LAFAYETTE ROAD
HAMPTON, N.H.
USA

Country: USA

Post/ZIP Code (required)	Phone, Fax, or E-mail (required)
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Total number of packages	Total Weight If DHL Express Document packaging used, enter XD.	Dimensions *(in inches)* Pieces	Length	Width	Height
1	80 lbs	____@		x	x
		____@		x	x
		____@		x	x

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Give Content and Quantity

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NO COMMERCIAL VALUE

6 Dutiable Shipments Only (Customs requirement)

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Declared Value for Customs (In US $) *(as on commercial/proforma invoice)*: 0.00

Schedule B Number / Harmonized Code (if applicable)

AES TRANSACTION NUMBER

TYPE OF EXPORT ☐ Permanent ☐ Repair/Return ☐ Temporary

Destination Duties/Taxes If left blank, Receiver pays duties/taxes.

☐ Receiver ☐ Shipper ☐ Other 920701629
Specify approved account number

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Other.....

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Drop Box #	TOTAL

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PAYMENT DETAILS (Check, Card No.)

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Type Expires

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CH2M HILL

APPLIED SCIENCES LABORATORY

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M Hill Project # 147323.JC.06.TW

Purchase Order # PHONE

Project Name: JOINT CANNERY OUTFALL

Company Name/CH2M HILL Office: CH2M HILL — PO BOX 1238, TRINIDAD, CA 95570

Project Manager & Phone #: Mr. [ ] Ms. [ ] Dr. [ ] STEVE COSTA 707-677-0123

Report Copy to: SAME

Requested Completion Date:

Sampling Requirements: SDWA [ ] NPDES [X] RCRA [ ] OTHER ____

Sample Disposal: Dispose [X] Return [ ]

LAB TEST CODES

SHADED AREA-- FOR LAB USE ONLY

Lab 1 # | Lab 2 #

Quote # | Kit Request #

Project #

No. of Samples | Page of

Login | LIMS Ver

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	ANALYSES REQUESTED: 96-HR MYSID ACUTE BIOASSAY	REMARKS	LAB 1 ID	LAB 2 ID
7-8 NOV 2006		X		X			JCO-06TW	1	X	100-50-25-12.5 6.25-[redacted] AS BEFORE		

Sampled By & Title (Please sign and print name): S. Costa	Date/Time: 7-8 NOV 06	Relinquished By (Please sign and print name): S. Costa	Date/Time: 9 NOV 06
Received By (Please sign and print name): Chris Patti	Date/Time: 11/16/06 1200	Relinquished By (Please sign and print name):	Date/Time:
Received By (Please sign and print name):	Date/Time:	Relinquished By (Please sign and print name):	Date/Time:
Received By (Please sign and print name):	Date/Time:	Shipped Via: UPS BUS Fed-Ex Hand Other DHL	Shipping #: 782-0788-4441
Work Authorized By (Please sign and print name):	Remarks: NOTE SOP FOR AERATION PROTOCOL		

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2 From (Shipper)

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	JOE CARNEY

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Company Name: STARKIST SAMOA (CH2M HILL)

Address	ALTERNATE
PAGO PAGO AMERICAN SAMOA	STEVE COSTA 684-258-1905

Post/ZIP Code (required)	Phone, Fax, or E-mail (required)
96799	684-644-6964

3 To (Receiver)

Company Name: ENVIROSYSTEMS, INC

Contact Name: BRIAN BUZBY

Delivery Address *DHL Cannot Deliver to a PO Box*

ONE LAFAYETTE ROAD
HAMPTON
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WATER QUALITY SAMPLES FOR LABORATORY ANALYSIS
NO COMMERCIAL VALUE

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Value for Customs (in US $) *(as on Commercial/Pro Forma Invoice)*: $50.00

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ATTACHMENT II

EnviroSystems, Inc. Laboratory Report
for May 2006 Supplementary Bioassay

TOXICOLOGICAL EVALUATION OF A TREATED EFFLUENT: BIOMONITORING SUPPORT FOR A NPDES PERMIT MAY 2006

American Samoa Joint Cannery Outfall

Prepared For

CH2M Hill, Incorporated
P.O. Box 1238
Trinidad, California 95570-1238

By

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

May 2006
Reference Number CH2M-Samoa14584-06-05

STUDY NUMBER 14584

EXECUTIVE SUMMARY

The following summarizes the results of acute exposure bioassays performed from May 31 to June 4, 2006 in support of the NPDES biomonitoring requirements of the American Samoa Joint Cannery Outfall. The 96 hour acute definitive assay was conducted using the marine species, *Americamysis bahia.*

Acute Toxicity Evaluation

Species	Exposure	LC-50	NOEC	LOEC
Americamysis bahia	24-Hours	50.4	25	50
	48-Hours	43.2	25	50
	72-Hours	42.7	25	50
	96-Hours	32.7	12.5	25

TOXICOLOGICAL EVALUATION OF A TREATED EFFLUENT: BIOMONITORING SUPPORT FOR A NPDES PERMIT MAY 2006

American Samoa Joint Cannery Outfall

1.0 INTRODUCTION

This report presents the results of an acute toxicity test conducted on an effluent sample collected from the American Samoa Joint Cannery Outfall. Testing was based on programs and protocols developed by the US EPA (2002) and involved conducting 96 hour acute static renewal toxicity tests with the marine species, *Americamysis bahia*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of the NELAC Standards (2000).

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test organisms are exposed to each effluent concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate (by regression) the median lethal concentration, or LC-50, defined as the effluent concentration which kills half of the test organisms. Samples with high LC-50 values are less likely to cause significant environmental impact. The acute no observed effect concentration (NOEC) and lowest observed effect concentration (LOEC) document the highest and lowest effluent concentrations that have no impact and a significant impact on the test species, respectively.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. See Section 4.0 for a list of references.

2.2 Test Species

Every attempt was made to acquire the species, *Penaeus vannami,* as this is the preferred organism under the Cannery's permit. ESI was unable to obtain reasonably priced *P. vannami*. Due to the exorbitant expense, the decision was made to use an alternate species, *Americamysis bahia*.

A. bahia, ≤5 days old, were from cultures maintained at Aquatic Research Organisms. Test organisms were transferred to test chambers by large bore pipet, minimizing the amount of water added to test solutions.

2.3 Effluent and Dilution Water

The effluent sample used in the assay was identified as "JC006SUPP." Sample collection information is provided in Table 1. Upon receipt, the sample was stored at 4°C. All sample material used in the assay was warmed to 20±1°C prior to preparing test solutions.

Total residual chlorine (TRC) was measured using amperometric titration (MDL 0.05 mg/L). As the effluent sample contained <0.05 mg/L, TRC dechlorination with sodium thiosulfate was not required (EPA 2002).

Aliquots of the undiluted effluent sample were collected for ammonia analysis when the sample arrived and again prior to renewal. Upon arrival, the effluent sample had a salinity of 11.5‰. Salinity of the effluent was increased to 24.9‰ by the addition of artificial sea salts. Test concentrations for the assays were 100%, 75%, 50%, 25%, 12.5%, and 6.25% effluent with a laboratory water diluent control.

The dilution water used in this assay was collected from the sea water system at ESI. The water is pumped in daily from the Hampton Estuary on the flood tide, filtered through a high volume sand filter, and stored in 3000 gallon polyethylene tanks. The water is classified as Class SA-1 by the State of New Hampshire, and has been used to culture test organisms for over 20 years. Sea water used in the assay had a salinity of 25±2‰ and a TRC of <0.05 mg/L.

2.4 Acute Toxicity Tests

The 96 hour acute static renewal toxicity test was conducted at 20±2°C with a photoperiod of 16:8 hours light:dark. Test chambers for the acute assays were 250 mL glass beakers containing 200 mL test solution in each of 5 replicates, with 10 organisms/replicate. Survival, dissolved oxygen, pH, salinity and temperature were measured daily in all replicates. Test solutions were renewed after 48 hours using effluent from the start sample. Mysid shrimp were fed daily with <24 hour old brine shrimp.

2.5 Data Analysis

At 24 hour intervals, survival data was analyzed to assess toxicity using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For acute exposure endpoints statistical significance was accepted at $\propto$ <0.05.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS

Results of the acute exposure bioassay conducted using the mysid shrimp, *A. bahia*, are summarized in Tables 3A and 3B. Effluent and dilution water characteristics are presented in Table 4. Table 5 provides a summary of historic data associated with the discharge. Support data are included in Appendix A.

3.1 Acute Toxicity Test - *Americamysis bahia*

Minimum test acceptability criteria require ≥90% survival in the control concentration. As the laboratory water diluent control met or exceeded this protocol specification, results associated with the assay indicate that healthy test organisms were used in the study and that the dilution water had no adverse impact on the outcome of the assay. These data are considered as valid for evaluating impacts associated with the effluent sample.

Table 3 provides a summary of the acute exposure data and results.

3.2 Summary

The salinity adjusted effluent sample collected from the American Samoa Joint Cannery Outfall exhibited significant signs of acute toxicity to the mysid shrimp, *Americamysis bahia,* during the 96 hour exposure period.

4.0 LITERATURE CITED

APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington D.C.

National Environmental Laboratory Accreditation Conference: Quality Systems. Chapter 5. June 2000.

Stephan, C. 1982. Documentation for Computing LC-50 Values with a Mini Computer. Unpublished.

US EPA. 2002. *Attachment G: NPDES Whole Effluent Toxicity Testing, Monitoring and Reporting Tips and Common Pitfalls.* Dated December 2002. US EPA Region I Offices, Boston, Massachusetts.

U.S. EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms*. Fifth Edition. EPA-821-R-02-012.

TABLE 1. Summary of Sample Collection Information. American Samoa Joint Cannery Outfall Effluent Evaluation. May 2006.

Sample Description	Type	Collection Date	Collection Time	Receipt Date	Receipt Time	Arrival Temp °C
EFFLUENT	Comp	05/25/06	ND	05/31/06	1215	8*

* Arrival temperature was outside of the range of 4±2°C recommended by the protocol.

TABLE 2. Summary of Reference Toxicant Data. American Samoa Joint Cannery Outfall Effluent Evaluation. May 2006.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
A. bahia						
05/30/06	Survival	LC-50	27.4	20.2	14.1 - 26.4	SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3A. Summary of Acute Evaluation Results. American Samoa Joint Cannery Outfall Effluent Evaluation. May 2006.

Concentration % Effluent	Exposure	Replicates					Mean	Standard Deviation	Coefficient of Variation
		A	B	C	D	E			
Lab Control	Start	10	10	10	10	10	100%	0.000	0.00%
	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	9	10	98%	0.045	4.56%
	72 Hours	10	10	10	9	10	98%	0.045	4.56%
	96-Hours	10	10	10	9	9	96%	0.055	5.71%
6.25%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	9	98%	0.045	4.56%
	72 Hours	10	10	10	10	9	98%	0.045	4.56%
	96-Hours	10	9	10	10	9	96%	0.055	5.71%
12.5%	24-Hours	10	9	10	10	10	98%	0.045	4.56%
	48-Hours	10	9	10	10	10	98%	0.045	4.56%
	72 Hours	10	9	10	10	10	98%	0.045	4.56%
	96-Hours	10	9	9	9	10	94%	0.055	5.83%
25%	24-Hours	9	10	8	10	3	80%	0.292	36.45%
	48-Hours	7	10	4	10	3	68%	0.327	48.10%
	72 Hours	7	10	4	10	3	68%	0.327	48.10%
	96-Hours	7	9	4	6	3	58%	0.239	41.17%
50%	24-Hours	8	1	2	2	5	36%	0.288	80.03%
	48-Hours	7	1	2	2	5	34%	0.251	73.82%
	72 Hours	7	1	2	2	5	34%	0.251	73.82%
	96-Hours	6	1	2	3	4	32%	0.192	60.13%
75%	24-Hours	10	5	0	10	1	52%	0.477	91.63%
	48-Hours	6	5	0	10	0	42%	0.427	101.57%
	72 Hours	6	5	0	10	0	42%	0.427	101.57%
	96-Hours	4	0	0	0	0	8%	0.179	223.63%
100%	24-Hours	7	0	0	7	5	38%	0.356	93.79%
	48-Hours	6	0	0	5	1	24%	0.288	120.04%
	72 Hours		0	0	5	1	12%	0.238	198.42%
	96-Hours	0	0	0	0	0	0%	0.000	0.00%

TABLE 3B. Summary of Acute Evaluation Results. American Samoa Joint Cannery Outfall Effluent Evaluation. May 2006.

	SUMMARY OF ENDPOINTS			
Exposure Period	LC-50 (95% Limits)	METHOD	NOEC	LOEC
24 Hours	50.4% (35.5-71.5)	Trimmed Spearman-Karber	25%	50%
48 Hours	43.2% (34.8-53.6)	Trimmed Spearman-Karber	25%	50%
72 Hours	42.7% (35.9-50.8)	Trimmed Spearman-Karber Direct Observation	25%	50%
96 Hours	32.7% (28.8-37.2)	Trimmed Spearman-Karber Direct Observation	12.5%	25%

TABLE 4. Summary of Effluent and Diluent Characteristics. American Samoa Joint Cannery Outfall Effluent Evaluation. May 2006.

PARAMETER	UNITS	100% EFFLUENT	50% EFFLUENT	DILUENT
Salinity - As Received	‰	11.5	-	25
Salinity - After Salinity Adjustment	‰	24.9	25	-
pH - As Received	SU	6.55	-	7.33
pH - After Salinity Adjustment	SU	7.03	7.35	-
TRC - As Received	mg/L	<0.05	-	<0.05
Dissolved Oxygen - As Received	mg/L	1.7	-	5.7
Dissolved Oxygen - After Aeration	mg/L	6.2	6.0	-
Ammonia - As Received	mg/L as N	24	-	0.23
Unionized Ammonia - As Received	mg/L as N	0.101	-	0.002
Ammonia - Salinity Adjusted	mg/L as N	-	12	-
Unionized Ammonia - Salinity Adjusted	mg/L as N	-	0.105	-
Ammonia - at 48 Hours	mg/L as N	20	13	<0.1
Unionized Ammonia - at 48 Hours	mg/L as N	0.192	0.221	<0.004

TABLE 5. Summary of StarKist Samoa and COS Samoa Packing Combined Effluent Bioassay Results. American Samoa Joint Cannery Outfall Effluent Evaluation. May 2006.

Date	Species	96-Hour Endpoints		
		LC-50	NOEC	LOEC
02/93[1]	*Penaeus vannami*	4.8%	3.1%	6.25%
10/93[1]	*Penaeus vannami*	15.67%	3.1%	6.25%
02/94[1]	*Penaeus vannami*	15.76%	<1.6%	1.6%
10/94[1]	*Americamysis bahia*	31.2%	25.0%	50.0%
03/95[1]	*Penaeus vannami*	14.8%	6.25%	12.5%
03/95[1]	*Americamysis bahia*	10.8%	6.25%	12.5%
02/96[1]	*Penaeus vannami*	>50.0%	>50.0%	>50.0%
03/96[1]	*Penaeus vannami*	44.4%	25.0%	50.0%
11/96[1]	*Penaeus vannami*	7.11%	3.1%	6.25%
03/97[1]	*Penaeus vannami*	39.36%	12.5%	25.0%
09/97[1]	*Penaeus vannami*	12.3%	6.25%	12.5%
06/98[1]	*Americamysis bahia*	17.2%	6.25%	12.5%
11/98[1]	*Americamysis bahia*	15.0%	6.25%	12.5%
02/00[1]	*Americamysis bahia*	20.0%	6.25%	12.5%
08/00[1]	*Americamysis bahia*	17.1%	3.1%	6.25%
03/01[2]	*Americamysis bahia*	13.81%	12.5%	25.0%
03/02[2]	*Americamysis bahia*	16.13%	12.5%	25.0%
08/02[2]	*Americamysis bahia*	10.23%	6.25%	12.5%
03/03[2]	*Americamysis bahia*	28.4%	25.0%	50.0%
08/03[2]	*Americamysis bahia*	43.2%	25.0%	50.0%
03/04[2]	*Americamysis bahia*	>50.0%	50.0%	>50.0%
10/04[2]	*Americamysis bahia*	>50.0%	50.0%	>50.0%
03/05[2]	*Americamysis bahia*	48.5%	25.0%	50.0%
10/05[2]	*Americamysis bahia*	>50.0%	50.0%	>50.0
03/06[2]	*Americamysis bahia*	35.6%	25.0%	50.0%
05/06[2]	*Americamysis bahia*	32.7%	12.5%	25.0%

Notes:

1. Assays conducted by Advanced Biological Testing, Inc., Rohnert Park, California
2. Assays conducted by EnviroSystems, Inc., Hampton, New Hampshire

APPENDIX A

DATA SHEETS

STATISTICAL SUPPORT

Contents	Number of Pages
Methods Used in NPDES Permit Biomonitoring Testing	1
A. bahia Acute Bioassay Data Summary	3
A. bahia Survival Statistics: LC-50, NOEC	16
A. bahia Organism Culture Sheet	1
Effluent & Diluent Chemistry and Water Quality Data	1
Record of Meters Used for Water Quality Measurements	1
Analytical Chemistry Summary	3
Unionized Ammonia Calculation	1
Sample Receipt Record	1
Chain of Custody	1

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays	
Ceriodaphnia dubia, Daphnia pulex	EPA-821-R-02-012
Pimephales promelas	EPA-821-R-02-012
Americamysis bahia	EPA-821-R-02-012
Menidia beryllina, Cyprinodon variegatus	EPA-821-R-02-012
Chronic Exposure Bioassays	
Ceriodaphnia dubia	EPA-821-R-02-013, 1002.0
Pimephales promelas	EPA-821-R-02-013, 1000.0
Cyprinodon variegatus	EPA-821-R-02-014, 1004.0
Menidia beryllina	EPA-821-R-02-014, 1006.0
Arbacia punctulata	EPA-821-R-02-014, 1008.0
Champia parvula	EPA-821-R-02-014, 1009.0
Trace Metals:	
ICP Metals	EPA 200.7/SW 6010
Hardness	Standard Methods 20th Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 20th Edition - Method 4500CLD
Total Organic Carbon	Standard Methods 20th Edition - Method 5310C
Specific Conductance	Standard Methods 20th Edition - Method 2510B
Nitrogen - Ammonia	Standard Methods 20th Edition - Method 4500NH3G
pH	Standard Methods 20th Edition - Method 4500H+B
Solids, Total (TS)	Standard Methods 20th Edition - Method 2540.B
Solids, Total Suspended (TSS)	Standard Methods 20th Edition - Method 2540D
Dissolved Oxygen	Standard Methods 20th Edition - Method 4500-O G

ACUTE BIOASSAY DATA SUMMARY

STUDY: 14584		"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES						
CLIENT: CH2M Hill	TEST ORGANISM: *A. bahia*		TRC	AMM 0 HR✖	AMM 48 HR✖	pH	DO	Salinity
SAMPLE: American Samoa	ORGANISM SUPPLIER/BATCH/AGE: *See Organism Culture Sheet*	EFFLUENT	See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet					
DILUENT: LAB SALT		DILUENT						

SALINITY ADJUSTMENT RECORD (IF APPLICABLE): 10,000 ML EFFLUENT + 156 G SEA SALTS = 100% ACTUAL PERCENTAGE

CONC	REP	SURVIVAL					✦DISSOLVED OXYGEN (MG/L)✦						PH (SU)						TEMPERATURE (°C)						SALINITY (ppt)					
		0	24	48	72	96	0	24	48◇	48☆	72	96	0	24	48◇	48☆	72	96	0	24	48◇	48	72	96	0	24	48◇	48	72	96
LAB	A	10	10	10	10	10	5.3	7.8	7.6	7.3	7.2	7.6	7.32	7.88	7.94	7.91	7.92	7.93	21	19	19	21	21	19	24	25	25	25	25	26
	B	10	10	10	10	10	5.7	7.8	7.8	7.3	7.2	7.6	7.33	7.74	7.95	7.97	7.95	7.94	21	19	19	21	21	19	25	25	26	25	25	26
	C	10	10	10	10	10	5.4	7.9	7.8	7.3	7.3	7.7	7.33	7.93	7.94	7.99	7.95	7.95	21	19	19	21	21	19	25	25	26	25	25	26
	D	10	10	9	9	9	5.3	8.0	7.9	7.2	7.3	7.7	7.34	7.94	7.94	7.97	7.95	7.94	21	19	19	21	21	19	25	25	26	25	25	26
	E	10	10	10	10	9	5.5	7.9	7.9	7.2	7.3	7.7	7.35	7.95	7.95	7.99	7.95	7.94	21	19	19	21	21	19	25	26	26	25	25	26
6.25%	A	10	10	10	10	10	6.0	7.9	7.9	6.8	6.9	7.5	7.37	7.86	7.96	7.95	7.87	7.96	21	19	19	21	21	19	25	25	26	25	25	26
	B	10	10	10	10	9	6.2	7.9	7.8	6.8	6.7	7.6	7.33	7.93	7.94	7.93	7.95	7.96	21	19	19	21	21	19	25	25	26	25	25	26
	C	10	10	10	10	10	6.4	7.8	7.8	6.8	6.7	7.6	7.38	7.96	7.96	7.93	7.95	7.96	21	19	19	21	21	19	25	25	26	25	25	26
	D	10	10	10	10	10	6.3	7.9	7.8	6.8	6.7	7.6	7.37	7.93	7.97	7.93	7.96	7.97	21	19	19	21	21	19	25	25	26	25	25	26
	E	10	10	9	9	9	6.4	7.9	7.9	6.5	6.6	7.7	7.40	7.96	7.97	7.94	7.96	7.97	21	19	19	21	21	19	25	26	26	25	25	26
DATE		5/31	6/1	6/2	6/3	6/4	5/31	6/1	6/2	6/2	6/3	6/4																		
TIME		1505	1320	1355	1320	1335	1415	1300	1335	1450	1310	1325																		
INITIALS		EG	EG	EG	YH	SJ	EG	EG	EG	EG	YH	SJ																		
FED?																														

✖ - See:" EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.
✦ - AERATE FROM START! ◇ - "Old" water qualities (prior to renewal) ☆ - "New"water qualities (post renewal)

ACUTE BIOASSAY DATA SUMMARY

STUDY: 14584	SAMPLE RECEIVED:	"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES					
CLIENT: CH2M Hill	TEST ORGANISM: *A. bahia*		TRC	AMM 0 HR✖	AMM 48 HR✖	pH	DO	Salinity
SAMPLE: American Samoa	ORGANISM SUPPLIER:	EFFLUENT	See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet					
DILUENT: LAB SALT	ORGANISM BATCH/AGE:	DILUENT						

CONC	REP	SURVIVAL					✦DISSOLVED OXYGEN (MG/L)✦						PH (SU)						TEMPERATURE (°C)						SALINITY (ppt)					
		0	24	48	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48	72	96	0	24	48◊	48	72	96
12.5%	A	10	9/10	9/10	10	10	5.9	7.9	7.5	6.0	6.1	7.5	7.34	7.96	7.96	7.89	7.90	7.98	21	19	19	21	21		25	25	26	25	25	
	B	10	9	9	9	9	6.0	7.7	7.6	6.0	6.1	7.6	7.35	7.97	7.94	7.88	7.89	7.97	21	19	19	21	21		25	25	26	25	25	
	C	10	10	10	10	9	6.1	7.8	7.6	6.2	6.1	7.6	7.37	7.96	7.96	7.88	7.89	7.97	21	19	19	21	21		25	25	26	25	25	
	D	10	10	10	10	9	6.2	7.7	7.6	6.3	6.2	7.6	7.36	7.94	7.96	7.88	7.88	7.96	21	19	19	21	21		25	25	26	25	25	
	E	10	10	10	10	10	6.3	7.8	7.7	6.0	6.1	7.5	7.37	7.97	8.00	7.89	7.88	7.96	21	19	19	21	21		25	26	26	25	25	
25%	A	10	9	7	7	7	5.8	7.1	5.3	6.2	6.1	7.5	7.28	7.93	7.72	7.75	7.76	8.13	21	19	19	21	21	19	25	25	26	25	25	26
	B	10	10	10	10	9	6.1	7.3	7.0	4.9	5.6	7.4	7.27	7.94	8.03	7.78	7.76	8.13	21	19	19	21	21	19	25	25	26	25	25	26
	C	10	8	4	4	4	6.0	7.4	7.3	4.8	4.9	7.4	7.27	7.91	8.04	7.78	7.77	8.12	21	19	19	21	21	19	25	25	26	25	25	26
	D	10	10	10	10	6	6.1	7.6	7.0	4.9	4.8	4.6	7.27	7.96	7.93	7.75	7.75	8.10	21	19	19	21	21	19	25	25	26	25	25	26
	E	10	3	3	3	3	6.0	7.5	4.6	4.3	4.3	6.8	7.28	7.90	7.70	7.71	7.72	8.10	21	19	19	21	21	19	25	25	26	25	25	26
50%	A	10	8	7	7	6	5.4	7.0	7.0	2.5	2.5	7.1	7.20	7.90	8.10	7.64	7.63	8.15	21	19	19	21	21	19	25	25	26	25	25	26
	B	10	1	1	1	1	5.5	6.4	7.4	2.7	2.7	4.6	7.20	7.91	8.15	7.64	7.63	8.15	21	19	19	21	21	19	25	25	26	25	25	26
	C	10	2	2	2	2	5.7	6.7	7.5	2.9	2.9	3.4	7.21	7.91	8.14	7.64	7.63	8.15	21	19	19	21	21	19	25	25	26	25	25	26
	D	10	2	2	2	3	5.5	6.9	7.3	2.9	2.9	6.7	7.21	7.91	8.15	7.63	7.63	8.14	21	19	19	21	21	19	25	25	26	25	25	26
	E	10	4/5	5	5	4	5.8	6.9	7.5	2.6	2.6	7.0	7.22	8.03	8.13	7.60	7.61	8.11	21	19	19	21	21	19	25	25	26	25	25	26
DATE		5/31	6/1	6/2	6/3	6/4	5/31	6/1	6/2	6/2	6/3	6/4																		
TIME		1505	1335	1410	1325	1335	1420	1310	1335	1555	1315	1325																		
INITIALS		EG	EG	EG	YL	SJ	EG	EG	EG	EG	YL	SJ																		
FED?																														

✖ - See:" EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.
✦ - AERATE FROM START! ◊ - "Old" water qualities (prior to renewal) ☆ - "New"water qualities (post renewal)

ACUTE BIOASSAY DATA SUMMARY

STUDY: 14584	SAMPLE RECEIVED:	"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES					
CLIENT: CH2M Hill	TEST ORGANISM: *A. bahia*		TRC	AMM 0 HR✖	AMM 48 HR✖	pH	DO	Salinity
SAMPLE: American Samoa	ORGANISM SUPPLIER:	EFFLUENT	See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet					
DILUENT: LAB SALT	ORGANISM BATCH/AGE:	DILUENT						

CONC	REP	SURVIVAL					✦DISSOLVED OXYGEN (MG/L)✦						PH (SU)						TEMPERATURE (°C)						SALINITY (ppt)					
		0	24	48	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48	72	96	0	24	48◊	48	72	96
75%	A	10	10	6	6	4	5.2	6.0	7.0	0.5	0.5	7.1	7.16	7.94	8.07 (8.18)	7.50	7.51	8.19	21	19	19	21	21	19	25	25	26	25	25	26
	B	10	5	5	5	0	5.1	6.2	7.3	0.5	0.5	7.0	7.17	7.82	8.17	7.52	5.52	8.19	21	19	19	21	21	19	25	25	26	25	25	26
	C	10	Ø	—	—	—	5.1	2.3	—	—	—	—	7.14	7.67	—	—	—	—	21	19	—	—	—	—	25	25	—	—	—	—
	D	10	10	10	10	0	5.3	5.5	7.3	0.5	0.5	6.3	7.15	7.89	8.18	7.50	7.50	8.05	21	19	19	21	21	19	25	25	26	25	25	26
	E	10	1	Ø	—	—	5.0	5.8	7.3	—	—	—	7.14	7.64	8.16	—	—	—	21	19	19	—	—	—	25	25	26	—	—	—
100%	A	10	7	6		0	5.3	5.5	7.2	0.5	0.5	6.8	7.05	7.94	8.17	7.39	7.40	8.19	21	19 (19)	19 (20)	21		19	25	25	26	25	25	26
	B	10	Ø	—	—	—	4.9	4.7	—	—	—	—	7.04	7.83	—	—	—	—	21	20	—	—	—	—	25	25	—	—	—	—
	C	10	Ø	—	—	—	5.0	5.2	—	—	—	—	7.04	7.77	—	—	—	—	21	20	—	—	—	—	25	25	—	—	—	—
	D	10	7	5	5	0	5.1	5.5	6.0	0.5	0.5	6.9	7.03	7.94	8.03	7.36	7.40	8.24	21	20	20	21	21	19	25	25	26	25	25	26
	E	10	5	1	1	0	5.0	3.2	6.9	0.5	0.5	6.7	7.03	7.89	8.21	7.35	7.37	8.10	21	20	20	21	21	19	25	26	26	25	25	26
DATE		5/31	6/1	6/2	6/3	6/4	5/31	6/1	6/2	6/2	6/3	6/4																		
TIME		1535	1345	1415	1330	1335	1430	1315	1340	1555	1320	1325																		
INITIALS		EG	EG	EG	AR	SJ	EG	EG	EG	EG	YP	SJ																		
FED?																														

✖ - See:" EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.
✦ - AERATE FROM START! ◊ - "Old" water qualities (prior to renewal) ☆ - "New"water qualities (post renewal)

CETIS Test Summary

Report Date: 18 Jul-06 4:30 PM
Link: 12-0159-0837

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method
03-5803-5512	24h Proportion Survived	25	50	35.355	37.45%	Steel's Many-One Rank
11-4142-6689	48h Proportion Survived	25	50	35.355	35.89%	Steel's Many-One Rank
06-5810-1487	72h Proportion Survived	25	50	35.355	40.24%	Bonferroni Adj Wilcoxon Rank Sum
10-1522-2120	96h Proportion Survived	12.5	25	17.678	19.15%	Dunnett's Multiple Comparison

Point Estimate Summary

Analysis	Endpoint	% Effect	Conc-%	95% LCL	95% UCL	Method
15-8458-6845	24h Proportion Survived	50	50.36943	35.47959	71.50814	Trimmed Spearman-Karber
05-8376-2064	48h Proportion Survived	50	43.22371	34.84295	53.62029	Trimmed Spearman-Karber
10-8629-6499	72h Proportion Survived	50	42.68265	35.87596	50.78076	Trimmed Spearman-Karber
09-2364-4726	96h Proportion Survived	50	32.74078	28.84212	37.16642	Trimmed Spearman-Karber

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision
09-2364-4726	96h Proportion Survived	Control Response	0.96	0.9 - N/A	Passes acceptability criteria
10-1522-2120	96h Proportion Survived	Control Response	0.96	0.9 - N/A	Passes acceptability criteria

CETIS Test Summary

Report Date: 18 Jul-06 4:30 PM
Link: 12-0159-0837

24h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
12.5		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
25		5	0.80000	0.30000	1.00000	0.13038	0.29155	36.44%
50		5	0.36000	0.10000	0.80000	0.12884	0.28810	80.03%
75		5	0.52000	0.00000	1.00000	0.21307	0.47645	91.62%
100		5	0.38000	0.00000	0.70000	0.15937	0.35637	93.78%

48h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
6.25		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
12.5		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
25		5	0.68000	0.30000	1.00000	0.14629	0.32711	48.10%
50		5	0.34000	0.10000	0.70000	0.11225	0.25100	73.82%
75		5	0.42000	0.00000	1.00000	0.19079	0.42661	101.57
100		5	0.24000	0.00000	0.60000	0.12884	0.28810	120.04

72h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
6.25		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
12.5		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
25		5	0.68000	0.30000	1.00000	0.14629	0.32711	48.10%
50		5	0.34000	0.10000	0.70000	0.11225	0.25100	73.82%
75		5	0.42000	0.00000	1.00000	0.19079	0.42661	101.57
100		5	0.15000	0.00000	0.50000	0.11902	0.23805	158.70

96h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.96000	0.90000	1.00000	0.02449	0.05477	5.71%
6.25		5	0.96000	0.90000	1.00000	0.02449	0.05477	5.71%
12.5		5	0.94000	0.90000	1.00000	0.02449	0.05477	5.83%
25		5	0.58000	0.30000	0.90000	0.10677	0.23875	41.16%
50		5	0.32000	0.10000	0.60000	0.08602	0.19235	60.11%
75		5	0.08000	0.00000	0.40000	0.08000	0.17889	223.61
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

CETIS Test Summary

Report Date: 18 Jul-06 4:30 PM
Link: 12-0159-0837

24h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	0.90000	1.00000	1.00000	1.00000
25		0.90000	1.00000	0.80000	1.00000	0.30000
50		0.80000	0.10000	0.20000	0.20000	0.50000
75		1.00000	0.50000	0.00000	1.00000	0.10000
100		0.70000	0.00000	0.00000	0.70000	0.50000

48h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	0.90000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	0.90000
12.5		1.00000	0.90000	1.00000	1.00000	1.00000
25		0.70000	1.00000	0.40000	1.00000	0.30000
50		0.70000	0.10000	0.20000	0.20000	0.50000
75		0.60000	0.50000	0.00000	1.00000	0.00000
100		0.60000	0.00000	0.00000	0.50000	0.10000

72h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	0.90000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	0.90000
12.5		1.00000	0.90000	1.00000	1.00000	1.00000
25		0.70000	1.00000	0.40000	1.00000	0.30000
50		0.70000	0.10000	0.20000	0.20000	0.50000
75		0.60000	0.50000	0.00000	1.00000	0.00000
100		N/A	0.00000	0.00000	0.50000	0.10000

96h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	0.90000	0.90000
6.25		1.00000	0.90000	1.00000	1.00000	0.90000
12.5		1.00000	0.90000	0.90000	0.90000	1.00000
25		0.70000	0.90000	0.40000	0.60000	0.30000
50		0.60000	0.10000	0.20000	0.30000	0.40000
75		0.40000	0.00000	0.00000	0.00000	0.00000
100		0.00000	0.00000	0.00000	0.00000	0.00000

CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
24h Proportion Survived	Comparison	12-0159-0837	12-0159-0837	18 Jul-06 4:28 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		25	50	4.00	35.355	37.45%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	11.02057	3.52756	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.93156	0.91004	0.04285	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	3.997188	0.6661979	6	6.19	0.00032	Significant Effect
Error	3.013542	0.1076265	28			
Total	7.01072931	0.7738244	34			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Water		6.25	27.5	16	> 0.0500	1	Non-Significant Effect
		12.5	25	16	> 0.0500	1	Non-Significant Effect
		25	20	16	> 0.0500	1	Non-Significant Effect
		50	15	16	<= 0.0500	2	Significant Effect
		75	20	16	> 0.0500	1	Non-Significant Effect
		100	15	16	<= 0.0500	3	Significant Effect

Data Summary

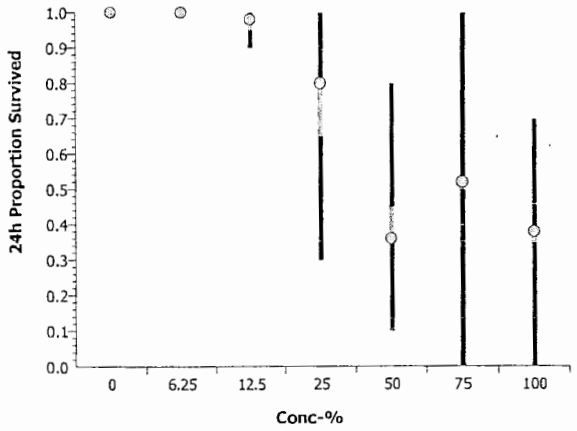
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
6.25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
12.5		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
25		5	0.80000	0.30000	1.00000	0.29155	1.15197	0.57964	1.41202	0.34433
50		5	0.36000	0.10000	0.80000	0.28810	0.62832	0.32175	1.10715	0.31708
75		5	0.52000	0.00000	1.00000	0.47645	0.81799	0.15878	1.41202	0.58898
100		5	0.38000	0.00000	0.70000	0.35637	0.61705	0.15878	0.99116	0.42670

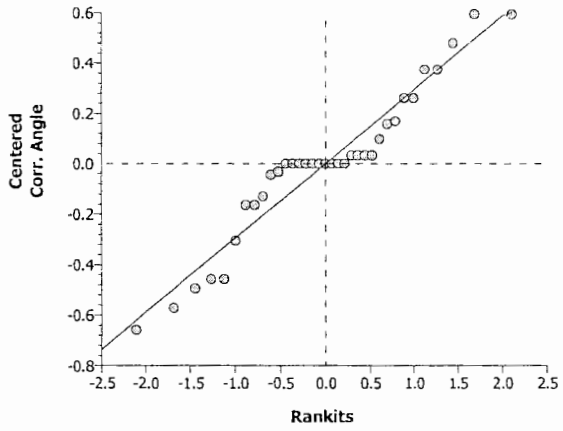
Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	1.00000					
12.5		1.00000	0.90000	1.00000	1.00000	1.00000					
25		0.90000	1.00000	0.80000	1.00000	0.30000					
50		0.80000	0.10000	0.20000	0.20000	0.50000					
75		1.00000	0.50000	0.00000	1.00000	0.10000					
100		0.70000	0.00000	0.00000	0.70000	0.50000					

CETIS Analysis Detail

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
72h Proportion Survived	Comparison	12-0159-0837	12-0159-0837	18 Jul-06 4:29 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Bonferroni Adj Wilcoxon Rank Sum	C > T	Angular (Corrected)		25	50	4.00	35.355	40.24%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	24.92201	16.81190	0.00035	Unequal Variances
Distribution	Shapiro-Wilk W	0.94083	0.90818	0.08690	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	5.105493	0.8509156	6	9.67	0.00001	Significant Effect
Error	2.376137	0.0880051	27			
Total	7.48163009	0.9389206	33			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Water		6.25	27.5		0.5000	2	Non-Significant Effect
		12.5	27.5		0.5000	2	Non-Significant Effect
		25	21		0.1111	1	Non-Significant Effect
		50	15		0.0040	2	Significant Effect
		75	18		0.0278	2	Non-Significant Effect
		100	10		0.0079	2	Significant Effect

Data Summary

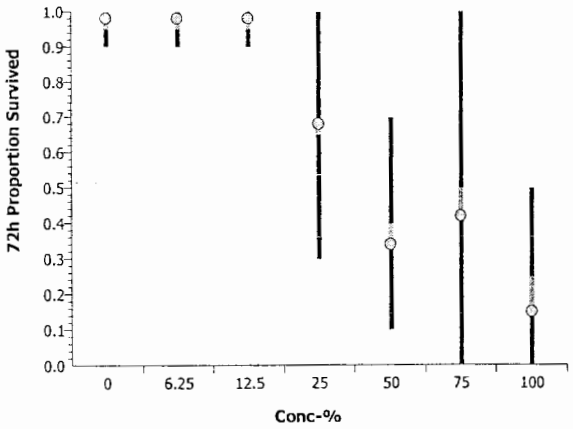
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
6.25		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
12.5		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
25		5	0.68000	0.30000	1.00000	0.32711	1.01591	0.57964	1.41202	0.39193
50		5	0.34000	0.10000	0.70000	0.25100	0.60512	0.32175	0.99116	0.27471
75		5	0.42000	0.00000	1.00000	0.42661	0.68021	0.15878	1.41202	0.53216
100		4	0.15000	0.00000	0.50000	0.23805	0.35618	0.15878	0.78540	0.29628

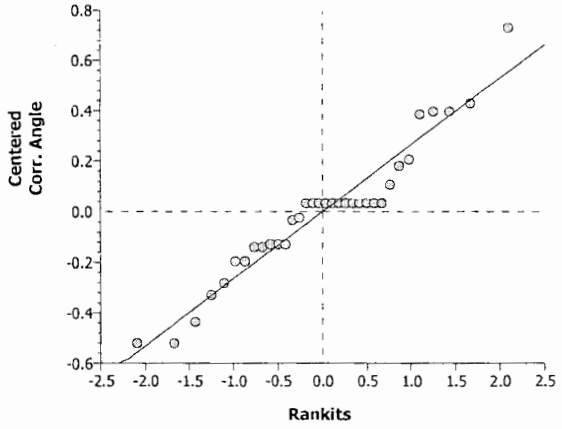
Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	1.00000	1.00000	1.00000	0.90000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	0.90000					
12.5		1.00000	0.90000	1.00000	1.00000	1.00000					
25		0.70000	1.00000	0.40000	1.00000	0.30000					
50		0.70000	0.10000	0.20000	0.20000	0.50000					
75		0.60000	0.50000	0.00000	1.00000	0.00000					
100		0.00000	0.00000	0.50000	0.10000						

CETIS Analysis Detail

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
96h Proportion Survived	Comparison	12-0159-0837	12-0159-0837	18 Jul-06 4:29 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Dunnett's Multiple Comparison	C > T	Angular (Corrected)		12.5	25	8.00	17.678	19.15%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.96	0.9 - N/A	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	9.35680	15.08628	0.09565	Equal Variances
Distribution	Shapiro-Wilk W	0.91758	0.89981	0.02886	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	5.274173	1.054835	5	32.52	0.00000	Significant Effect
Error	0.7784472	0.0324353	24			
Total	6.05261993	1.0872699	29			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	MSD	Decision(0.05)
Lab Water		6.25	0	2.36	> 0.0500	0.26881	Non-Significant Effect
		12.5	0.28615	2.36	> 0.0500	0.26881	Non-Significant Effect
		25	4.11487	2.36	<= 0.0500	0.26881	Significant Effect
		50	6.66931	2.36	<= 0.0500	0.26881	Significant Effect
		75	9.50678	2.36	<= 0.0500	0.26881	Significant Effect

Data Summary

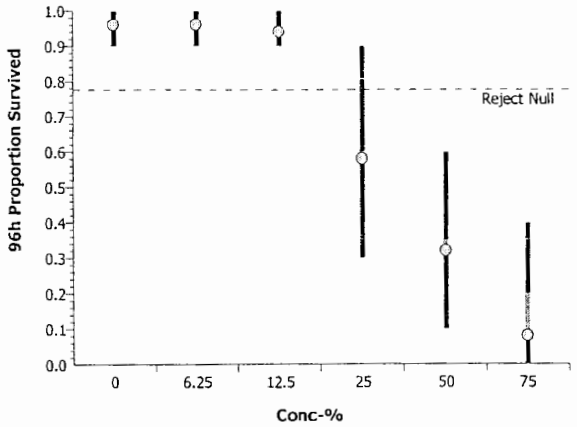
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	0.96000	0.90000	1.00000	0.05477	1.34683	1.24905	1.41202	0.08926
6.25		5	0.96000	0.90000	1.00000	0.05477	1.34683	1.24905	1.41202	0.08926
12.5		5	0.94000	0.90000	1.00000	0.05477	1.31423	1.24905	1.41202	0.08926
25		5	0.58000	0.30000	0.90000	0.23875	0.87813	0.57964	1.24905	0.26312
50		5	0.32000	0.10000	0.60000	0.19235	0.58717	0.32175	0.88608	0.21484
75		5	0.08000	0.00000	0.40000	0.17889	0.26397	0.15878	0.68472	0.23521

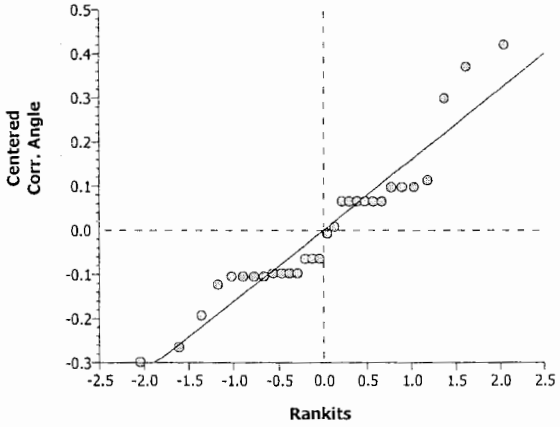
Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	1.00000	1.00000	1.00000	0.90000	0.90000					
6.25		1.00000	0.90000	1.00000	1.00000	0.90000					
12.5		1.00000	0.90000	0.90000	0.90000	1.00000					
25		0.70000	0.90000	0.40000	0.60000	0.30000					
50		0.60000	0.10000	0.20000	0.30000	0.40000					
75		0.40000	0.00000	0.00000	0.00000	0.00000					

CETIS Analysis Detail

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
48h Proportion Survived	Comparison	12-0159-0837	12-0159-0837	18 Jul-06 4:29 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		25	50	4.00	35.355	35.89%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Bartlett	25.20560	16.81190	0.00031	Unequal Variances
Distribution	Shapiro-Wilk W	0.95120	0.91004	0.16196	Normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	4.891127	0.8151878	6	8.78	0.00002	Significant Effect
Error	2.600772	0.0928847	28			
Total	7.49189854	0.9080725	34			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Water		6.25	27.5	16	> 0.0500	2	Non-Significant Effect
		12.5	27.5	16	> 0.0500	2	Non-Significant Effect
		25	21	16	> 0.0500	1	Non-Significant Effect
		50	15	16	<= 0.0500	2	Significant Effect
		75	18	16	> 0.0500	2	Non-Significant Effect
		100	15	16	<= 0.0500	2	Significant Effect

Data Summary

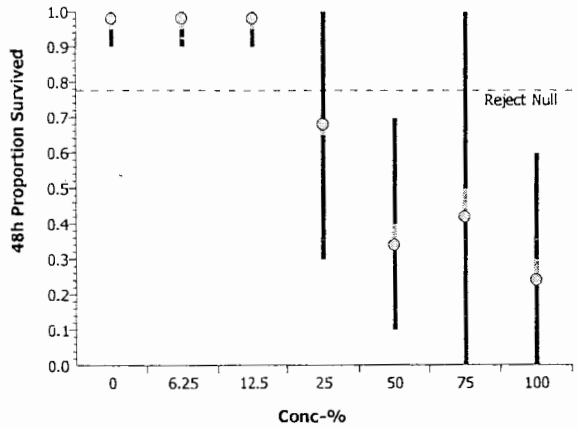
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
6.25		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
12.5		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
25		5	0.68000	0.30000	1.00000	0.32711	1.01591	0.57964	1.41202	0.39193
50		5	0.34000	0.10000	0.70000	0.25100	0.60512	0.32175	0.99116	0.27471
75		5	0.42000	0.00000	1.00000	0.42661	0.68021	0.15878	1.41202	0.53216
100		5	0.24000	0.00000	0.60000	0.28810	0.46216	0.15878	0.88608	0.34928

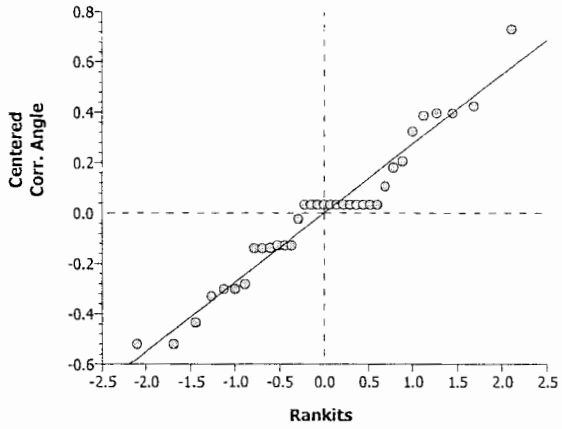
Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	1.00000	1.00000	1.00000	0.90000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	0.90000					
12.5		1.00000	0.90000	1.00000	1.00000	1.00000					
25		0.70000	1.00000	0.40000	1.00000	0.30000					
50		0.70000	0.10000	0.20000	0.20000	0.50000					
75		0.60000	0.50000	0.00000	1.00000	0.00000					
100		0.60000	0.00000	0.00000	0.50000	0.10000					

CETIS Analysis Detail

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
48h Proportion Survived	Trimmed Spearman-Karber	12-0159-0837	12-0159-0837	27 Jun-06 11:49 AM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0.02	24.49%	1.635722	0.04680356

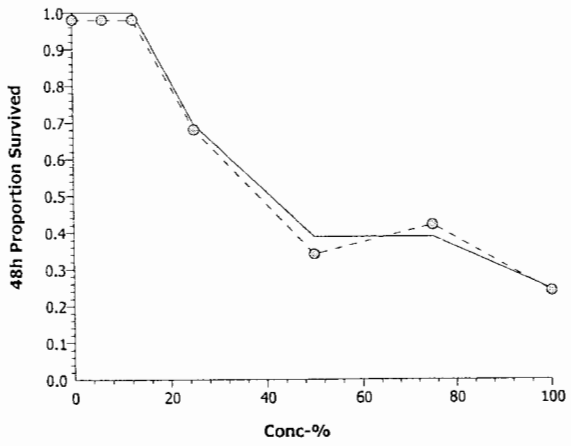
Point Estimates

EC50/LC50	95% LCL	95% UCL
43.22371	34.84295	53.62029

Data Summary

			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
6.25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
12.5		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
25		5	0.68000	0.30000	1.00000	0.06677	0.32711	34	50
50		5	0.34000	0.10000	0.70000	0.05123	0.25100	17	50
75		5	0.42000	0.00000	1.00000	0.08708	0.42661	21	50
100		5	0.24000	0.00000	0.60000	0.05881	0.28810	12	50

Graphics



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
96h Proportion Survived	Trimmed Spearman-Karber	12-0159-0837	12-0159-0837	27 Jun-06 11:49 AM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0.04	0.00%	1.515089	0.02753091

Point Estimates

EC50/LC50	95% LCL	95% UCL
32.74078	28.84212	37.16642

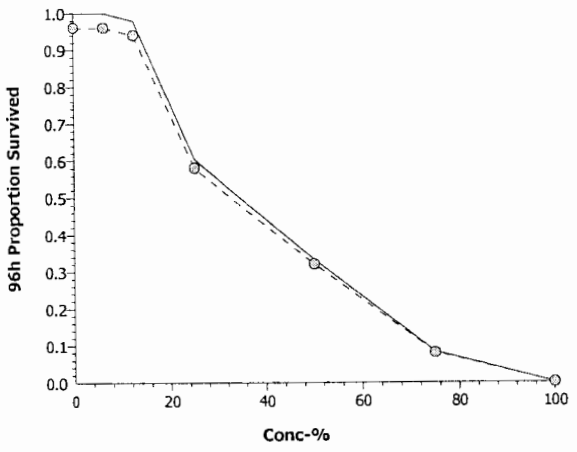
Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.96	0.9 - N/A	Passes acceptability criteria

Data Summary

			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.96000	0.90000	1.00000	0.01118	0.05477	48	50
6.25		5	0.96000	0.90000	1.00000	0.01118	0.05477	48	50
12.5		5	0.94000	0.90000	1.00000	0.01118	0.05477	47	50
25		5	0.58000	0.30000	0.90000	0.04873	0.23875	29	50
50		5	0.32000	0.10000	0.60000	0.03926	0.19235	16	50
75		5	0.08000	0.00000	0.40000	0.03651	0.17889	4	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50

Graphics



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
72h Proportion Survived	Trimmed Spearman-Karber	12-0159-0837	12-0159-0837	27 Jun-06 11:49 AM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0.02	15.31%	1.630251	0.03772391

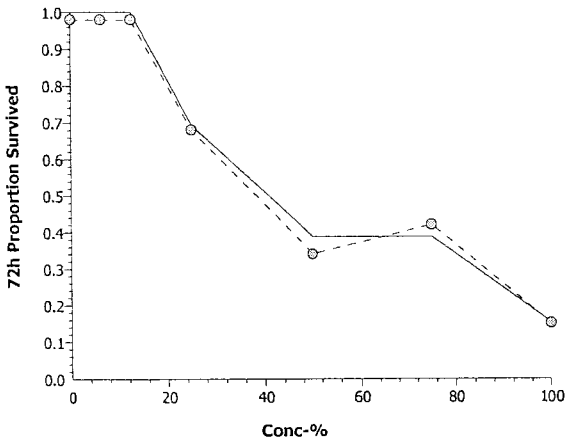
Point Estimates

EC50/LC50	95% LCL	95% UCL
42.68265	35.87596	50.78076

Data Summary

Conc-%	Control Type	Count	Calculated Variate(A/B) Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
6.25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
12.5		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
25		5	0.68000	0.30000	1.00000	0.06677	0.32711	34	50
50		5	0.34000	0.10000	0.70000	0.05123	0.25100	17	50
75		5	0.42000	0.00000	1.00000	0.08708	0.42661	21	50
100		4	0.15000	0.00000	0.50000	0.04859	0.23805	6	40

Graphics



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Test No:	16-7688-1623	**Test Type:**	Survival (96h)	**Duration:**	94h
Start Date:	31 May-06 03:05 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	04 Jun-06 01:35 PM	**Dil Water:**	Natural Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	31 May-06 03:05 PM	**Brine:**	Generic commercial salts		

Sample No:	04-7158-0505	**Material:**	Industrial Effluent	**Client:**	CH2M Hill
Sample Date:	25 May-06	**Code:**	14584	**Project:**	WET Quarterly Compliance Test (2Q)
Receive Date:	31 May-06 12:15 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	6d 15h (8 °C)	**Station:**	Joint Cannery Outfall		

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
24h Proportion Survived	Trimmed Spearman-Karber	12-0159-0837	12-0159-0837	27 Jun-06 11:49 AM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0	38.00%	1.702167	0.07609422

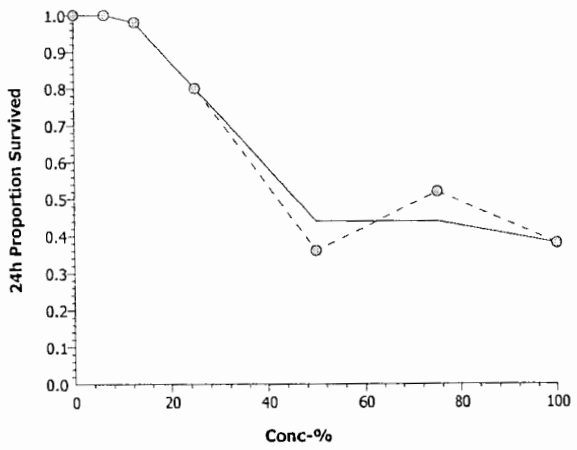
Point Estimates

EC50/LC50	95% LCL	95% UCL
50.36943	35.47959	71.50814

Data Summary

			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
25		5	0.80000	0.30000	1.00000	0.05951	0.29155	40	50
50		5	0.36000	0.10000	0.80000	0.05881	0.28810	18	50
75		5	0.52000	0.00000	1.00000	0.09725	0.47645	26	50
100		5	0.38000	0.00000	0.70000	0.07274	0.35637	19	50

Graphics



CETIS Data Worksheet

Report Date: 27 Jun-06 11:40 AM
Link: 12-0159-0837

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Start Date: 31 May-06 03:05 PM
Ending Date: 04 Jun-06 01:35 PM
Sample Date: 25 May-06
Species: Americamysis bahia
Protocol: EPA/821/R-02-012 (2002)
Material: Industrial Effluent
Sample Code: 14584
Sample Source: CH2M Hill- American Samoa
Sample Station: Joint Cannery Outfall

Conc-%	Code	Rep	Pos	# Exposed	24h Survival	48h Survival	72h Survival	96h Survival	Notes
0	L	1	16	10	10	10	10	10	
0	L	2	5	10	10	10	10	10	
0	L	3	33	10	10	10	10	10	
0	L	4	31	10	10	9	9	9	
0	L	5	22	10	10	10	10	9	
6.25		1	13	10	10	10	10	10	
6.25		2	26	10	10	10	10	9	
6.25		3	6	10	10	10	10	10	
6.25		4	25	10	10	10	10	10	
6.25		5	20	10	10	9	9	9	
12.5		1	4	10	10	10	10	10	
12.5		2	30	10	9	9	9	9	
12.5		3	7	10	10	10	10	9	
12.5		4	34	10	10	10	10	9	
12.5		5	2	10	10	10	10	10	
25		1	1	10	9	7	7	7	
25		2	28	10	10	10	10	9	
25		3	11	10	8	4	4	4	
25		4	19	10	10	10	10	6	
25		5	10	10	3	3	3	3	
50		1	8	10	8	7	7	6	
50		2	23	10	1	1	1	1	
50		3	21	10	2	2	2	2	
50		4	27	10	2	2	2	3	
50		5	3	10	5	5	5	4	
75		1	18	10	10	6	6	4	
75		2	12	10	5	5	5	0	
75		3	9	10	0	0	0	0	
75		4	32	10	10	10	10	0	
75		5	24	10	1	0	0	0	
100		1	14	10	7	6		0	
100		2	29	10	0	0	0	0	
100		3	17	10	0	0	0	0	
100		4	35	10	7	5	5	0	
100		5	15	10	5	1	1	0	

Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS BAHIA

Source: Lab reared ✓ Hatchery reared _____ Field collected _____

Hatch date 5-27-06 Receipt date _____

Lot number 052706HS Strain _____

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ~30 ppt DO —

pH 7.8 Hardness _____ ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ✓ Phytoplankton _____ Trout Chow ✓

Brine Shrimp ✓ Rotifers _____ Other Excp. Shrimp Diet

Prophylactic Treatments: _____

Comments: _____

IV. Shipping Information

Client: EST # of Organisms: 700+

Carrier: _____ Date Shipped: 5-31-06

Biologist: Mark Mourning

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA

PARAMETER	100% Effluent	50% Effluent	Diluent - Lab Salt
TRC	<0.05		<0.05
As Received - pH (SU) @ 20°C	6.55		7.33
As Received - Salinity (ppt)	11.5		25
As Received - Dissolved Oxygen (mg/L)‡	1.7		5.7
As Received - Ammonia (pull)	-002		~~-004~~ 14520-015
Salinity Adjusted - pH (SU) @ 20°C	7.03	7.35	
Salinity Adjusted - Salinity (ppt)	24.9	25	
After Aeration - Dissolved Oxygen (mg/L)	6.2	6.0	
Salinity Adjusted - Ammonia (pull)		-003	
48 hour Ammonia (pull)	-004	-005	-006
48 hour pH (SU) @ 20°C	7.39	7.64	7.97

‡ - Aerate prior to mixing concentrations.

PREPARATION OF DILUTIONS

STUDY: 14584 | CLIENT: CH2M HILL - American Samoa

SPECIES: *A. bahia*

Diluent: Lab Salt	Day: 0 Sample: EOA		Day: 2 Sample: EOA					
Concentration	Vol. Eff.	Final Vol	Vol. Eff.	Final Vol	HRS	Date	Time	Initials
LAB	0	1000	0	750	0	5/31	1505	EG
6.25%	62.5	↓	46.9	↓	48	6/2	1510	EG
12.5%	125		93.7					
25%	250		187.5		Comments:			
50%	500		375					
75%	750		562.5					
100%	1000		~~750~~ 585	585				

585

RECORD OF METERS USED FOR WATER QUALITY MEASUREMENTS

STUDY: 14584	CLIENT: CH2M HILL - American Samoa					
WATER QUALITIES - A. bahia						
HOURS:	0	24	48 - old	48 - new	72	96
Water Quality Station #	1	1	1	1	1	2
Initials	EG	EG	EG	EG	YE	SJ
Date	5/31 10:00	6/1	6/2	6/2	6/3	6/4

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #	3	DO meter #	19	
DO probe #	13	DO probe #	12	
pH meter #	1097	pH meter #	470	
pH probe #	44	pH probe #	45	
S/C meter #	YSI 30B	S/C meter #	YSI 30B	
S/C probe #	1(	S/C probe #	4	
Salinity meter #	41	Salinity meter #		

Report No: 14584 SDG:
Project: American Samoa

Sample ID: Effluent
Matrix: Water
Sampled: 05/25/06

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference
Ammonia-N	14584-002	24	0.2	mg/L as N	06/06/06	06/06/06	SM 4500-NH3 G
Ammonia-N	14584-005	13	0.1	mg/L as N	06/06/06	06/06/06	SM 4500-NH3 G
Ammonia-N	14584-003	12	0.1	mg/L as N	06/06/06	06/06/06	SM 4500-NH3 G
Ammonia-N	14584-004	20	0.1	mg/L as N	06/06/06	06/06/06	SM 4500-NH3 G

Notes:

Report No: 14584 SDG:
Project: American Samoa

Sample ID: Diluent - Lab Salt
Matrix: Water
Sampled: 06/02/06

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference
Ammonia-N	14584-006	ND	0.1	mg/L as N	06/06/06	06/06/06	SM 4500-NH3 G

Notes:

ND = Not Detected

Report No: 14520 SDG:
Project: American Samoa

Sample ID: ESIN1 LAB SALT 25PPT 05310
Matrix: Water
Sampled: 05/31/06

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference
Ammonia-N	14520-015	0.23	0.1	mg/L as N	06/06/06	06/06/06	SM 4500-NH3 G

Notes:

STUDY: 14584
CLIENT: CH2MHill - American Samoa
PROJECT: Wastewater Treatment Plant
TASK: Unionized Ammonia Calculations

Day / Date	Treatment	Temperature Deg C	Sample pH SU	NH3 mg/L	Unionized NH3 mg/L
Day 0	Lab Diluent	20	7.33	0.23	0.002
	50% Effluent	20	7.35	12.0	0.105
	100% Effluent	20	7.03	24.0	0.101
Day 2	Lab Diluent	20	7.97	0.1	0.004
	50% Effluent	20	7.64	13.0	0.221
	100% Effluent	20	7.39	20.0	0.192

ESI

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

ESI STUDY NUMBER: 14584 **CLIENT:** CH2M Hill

SAMPLE RECEIPT:
DATE: 5/31/06 TIME: 1215 BY: CP

DELIVERED VIA: ☐ FEDEX ☐ CLIENT ☐ ESI ☐ UPS ☒ OTHER DHL

LOGGED INTO LAB:
DATE: 5/31/06 TIME: 1220 BY: EG

SAMPLE CONDITION:

CHAIN OF CUSTODY:	☒ YES	☐ NO
CHAIN OF CUSTODY SIGNED:	☒ YES	☐ NO
CHAIN OF CUSTODY COMPLETE:	☐ YES	☒ NO
SAMPLE DATE:	☒ YES	☐ NO
SAMPLE TIME RECORDED:	☐ YES	☒ NO
SAMPLE TYPE IDENTIFIED:	☒ YES	☐ NO
CUSTODY SEAL IN PLACE:	☒ YES	☐ NO
SHIPPING CONTAINER INTACT:	☒ YES	☐ NO

SAMPLE TEMPERATURE (AT ARRIVAL): 8 °C

DOES CLIENT NEED NOTIFICATION OF TEMPERATURE? ☐ YES ☒ NO

SAMPLE ARRIVED ON ICE: ☒ YES ☐ NO

COMMENTS: 1 x 5 gal Eff

CH2M HILL

APPLIED SCIENCES LABORATORY

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M Hill Project # 147323.JC.06.NT

Purchase Order #

Project Name: SAMOA JOINT CANNERY OUTFALL

Company Name/CH2M HILL Office: CH2M HILL / P.O. BOX 1238 / TRINIDAD, CA 95570

Project Manager & Phone #
Mr. [ ] STEVE COSTA
Ms. [ ]
Dr. [ ] 707-677-0123

Report Copy to:

Requested Completion Date:

Sampling Requirements: SDWA [ ] NPDES [ ] RCRA [ ] OTHER ____

Sample Disposal: Dispose [ ] Return [ ]

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	ANALYSES REQUESTED: M/SIO 96-HR ACUTE BIOASSAY	REMARKS	LAB 1 ID	LAB 2 ID
5/25/06		X		X			JC06SUPP	1	X			

LAB TEST CODES

SHADED AREA-- FOR LAB USE ONLY

Lab 1 # | Lab 2 #

Quote # | Kit Request #

Project #

No. of Samples | Page ___ of ___

Login | LIMS Ver

Sampled By & Time: S. Costa (Please sign and print name) — Date/Time 5/25/06

Relinquished By: S. Costa (Please sign and print name) — Date/Time 5/25/06

QC Level: 1 2 3 Other: ____

Received By: DHL (Please sign and print name) — Date/Time

Relinquished By: DHL (Please sign and print name) — Date/Time

COC Rec | ICE

Received By: [signature] 5/31/06 (Please sign and print name) — Date/Time 1215

Relinquished By (Please sign and print name) — Date/Time

Ana Req | TEMP

Cust Seal | Ph

Received By (Please sign and print name) — Date/Time

Shipped Via: UPS BUS Fed-Ex Hand Other DHL — Shipping #

Work Authorized By (Please sign and print name)

Remarks: AERATE PER EMAIL INSTRUCTIONS

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original - LAB, Yellow - LAB, Pink - Client

REV 3/94 FORM 340

ATTACHMENT III

EnviroSystems, Inc. Laboratory Report
for November 2006 Bioassay

TOXICOLOGICAL EVALUATION OF A TREATED EFFLUENT: BIOMONITORING SUPPORT FOR A NPDES PERMIT NOVEMBER 2006

American Samoa Joint Cannery Outfall

Prepared For

CH2M Hill, Incorporated
P.O. Box 1238
Trinidad, California 95570-1238

By

EnviroSystems, Incorporated
One Lafayette Road
Hampton, New Hampshire 03842

November 2006
Reference Number CH2M-Samoa15231-06-11

STUDY NUMBER 15231

EXECUTIVE SUMMARY

The following summarizes the results of acute exposure bioassays performed from November 16-20, 2006 in support of the NPDES biomonitoring requirements of the American Samoa Joint Cannery Outfall. The 96 hour acute definitive assay was conducted using the marine species, *Americamysis bahia.*

Acute Toxicity Evaluation

Species	Exposure	LC-50	NOEC	LOEC
Americamysis bahia	24-Hours	55.1%	50%	75%
	48-Hours	51.9%	50%	75%
	72-Hours	50.5%	50%	75%
	96-Hours	43.1%	25%	50%

TOXICOLOGICAL EVALUATION OF A TREATED EFFLUENT: BIOMONITORING SUPPORT FOR A NPDES PERMIT NOVEMBER 2006

American Samoa Joint Cannery Outfall

1.0 INTRODUCTION

This report presents the results of an acute toxicity test conducted on an effluent sample collected from the American Samoa Joint Cannery Outfall. Testing was based on programs and protocols developed by the US EPA (2002) and involved conducting 96 hour acute static renewal toxicity tests with the marine species, *Americamysis bahia*. Testing was performed at EnviroSystems, Incorporated (ESI), Hampton, New Hampshire in accordance with the provisions of the NELAC Standards (2000).

Acute toxicity tests involve preparing a series of concentrations by diluting effluent with control water. Groups of test organisms are exposed to each effluent concentration and a control for a specified period. In acute tests, mortality data for each concentration are used to calculate (by regression) the median lethal concentration, or LC-50, defined as the effluent concentration which kills half of the test organisms. Samples with high LC-50 values are less likely to cause significant environmental impact. The acute no observed effect concentration (NOEC) and lowest observed effect concentration (LOEC) document the highest and lowest effluent concentrations that have no impact and a significant impact on the test species, respectively.

2.0 MATERIALS AND METHODS

2.1 General Methods

Toxicological and analytical protocols used in this program follow procedures primarily designed by the EPA to provide standard approaches for the evaluation of toxicological effects of discharges on aquatic organisms, and for the analysis of water samples. See Section 4.0 for a list of references.

2.2 Test Species

Every attempt was made to acquire the species, *Penaeus vannami,* as this is the preferred organism under the Cannery's permit. ESI was unable to obtain reasonably priced *P. vannami.* Due to the exorbitant expense, the decision was made to use an alternate species, *Americamysis bahia.*

A. bahia, ≤5 days old, were from maintained at ESI. Test organisms were transferred to test chambers by large bore pipet, minimizing the amount of water added to test solutions.

2.3 Effluent and Dilution Water

The effluent sample used in the assay was identified as "JC0-06TW". Sample collection information is provided in Table 1. Upon receipt, the sample was stored at 4°C. All sample material used in the assay was warmed to 20±1°C prior to preparing test solutions. Total residual chlorine (TRC) was measured using amperometric titration (MDL 0.05 mg/L). As the effluent sample contained <0.05 mg/L, TRC dechlorination with sodium thiosulfate was not required (EPA 2002). Aliquots of the undiluted effluent sample were collected for ammonia analysis when the sample arrived and again prior to renewal. Upon arrival, the effluent sample had a salinity of 11‰. Salinity of the effluent was increased to 25‰ by the addition of artificial sea salts. Test concentrations for the assays were 100%, 75%, 50%, 25%, 12.5%, and 6.25% effluent with a laboratory water diluent control.

The dilution water used in this assay was collected from the sea water system at ESI. The water is pumped in daily from the Hampton Estuary on the flood tide, filtered through a high volume sand filter, and stored in 3000 gallon polyethylene tanks. The water is classified as Class SA-1 by the State of New Hampshire, and has been used to culture test organisms for over 20 years. Sea water used in the assay had a salinity of 25±2‰ and a TRC of <0.05 mg/L.

2.4 Acute Toxicity Tests

The 96 hour acute static renewal toxicity test was conducted at 20±2°C with a photoperiod of 16:8 hours light:dark. Test chambers for the acute assays were 250 mL glass beakers containing 200 mL test solution in each of 5 replicates, with 10 organisms/replicate. Survival, dissolved oxygen, pH, salinity and temperature were measured daily in all replicates. Test solutions were renewed after 48 hours using effluent from the start sample. Mysid shrimp were fed daily with <24 hour old brine shrimp.

2.5 Data Analysis

At 24 hour intervals, survival data was analyzed to assess toxicity using CETIS, Comprehensive Environmental Toxicity Testing System, software. The program computes acute exposure endpoints based on EPA decision tree guidelines specified in individual test methods. For acute exposure endpoints statistical significance was accepted at $\propto$ <0.05.

2.6 Quality Control

As part of the laboratory quality control program, standard reference toxicant assays are conducted on a regular basis for each test species. These results provide relative health and response data while allowing for comparison with historic data sets. See Table 2 for details.

3.0 RESULTS

Results of the acute exposure bioassay conducted using the mysid shrimp, *A. bahia*, are summarized in Table 3. Effluent and dilution water characteristics are presented in Table 4. Table 5 provides a summary of historic data associated with the discharge. Support data are included in Appendix A.

3.1 Acute Toxicity Test - *Americamysis bahia*

Minimum test acceptability criteria require ≥90% survival in the control concentration. As the laboratory water diluent control met or exceeded this protocol specification, results associated with the assay indicate healthy test organisms and that the dilution water had no adverse impact on the outcome of the assay. These data are considered as valid for evaluating impacts associated with the effluent sample.

Table 3 provides a summary of the acute exposure data and results.

3.2 Summary

The salinity adjusted effluent sample collected from the American Samoa Joint Cannery Outfall did exhibit signs of acute toxicity to the mysid shrimp, *Americamysis bahia,* during the 96 hour exposure period.

4.0 LITERATURE CITED

APHA. 1998. *Standard Methods for the Examination of Water and Wastewater*, 20th Edition. Washington D.C.

National Environmental Laboratory Accreditation Conference: Quality Systems. Chapter 5. June 2000.

Stephan, C. 1982. Documentation for Computing LC-50 Values with a Mini Computer. Unpublished.

US EPA. 2002. *Attachment G: NPDES Whole Effluent Toxicity Testing, Monitoring and Reporting Tips and Common Pitfalls.* Dated December 2002. US EPA Region I Offices, Boston, Massachusetts.

U.S. EPA. 2002. *Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms.* Fifth Edition. EPA-821-R-02-012.

TABLE 1. Summary of Sample Collection Information. American Samoa Joint Cannery Outfall Effluent Evaluation. November 2006.

Sample Description	Type	Collection Date	Collection Time	Receipt Date	Receipt Time	Arrival Temp °C
EFFLUENT	Comp	11/07-08/06	ND	11/16/06	1200	18

TABLE 2. Summary of Reference Toxicant Data. American Samoa Joint Cannery Outfall Effluent Evaluation. November 2006.

Date	Endpoint		Value	Historic Mean/ Central Tendency	Acceptable Range	Reference Toxicant
A. bahia						
11/06/06	Survival	LC-50	18.4	20.3	15.5 - 25.4	SDS (mg/L)

Means and Acceptable Ranges based on the most recent 20 reference toxicant assays

TABLE 3A. Summary of Acute Evaluation Results.
American Samoa Joint Cannery Outfall Effluent Evaluation.
November 2006.

Concentration % Effluent	Exposure	Replicates A	B	C	D	E	Mean	Standard Deviation	Coefficient of Variation
Lab Control	Start	10	10	10	10	10	100%	0.000	0.00%
	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	10	100%	0.000	0.00%
	72 Hours	9	10	10	10	10	98%	0.400	4.08%
	96-Hours	9	10	10	10	10	98%	0.400	4.08%
6.25%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	10	100%	0.000	0.00%
	72 Hours	10	10	10	10	10	100%	0.000	0.00%
	96-Hours	10	10	10	10	10	100%	0.000	0.00%
12.5%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	10	100%	0.000	0.00%
	72 Hours	10	10	10	10	10	100%	0.000	0.00%
	96-Hours	10	10	10	10	10	100%	0.000	0.00%
25%	24-Hours	10	10	10	10	10	100%	0.000	0.00%
	48-Hours	10	10	10	10	9	98%	0.400	4.08%
	72 Hours	10	10	10	10	9	98%	0.400	4.08%
	96-Hours	8	9	8	10	9	88%	0.748	8.50%
50%	24-Hours	10	7	6	9	4	72%	2.135	29.66%
	48-Hours	10	7	6	9	3	70%	2.449	34.99%
	72 Hours	10	6	6	8	3	66%	2.332	35.34%
	96-Hours	8	3	4	5	3	46%	1.855	40.32%
75%	24-Hours	0	1	3	2	1	14%	1.020	72.84%
	48-Hours	0	0	2	0	0	4%	0.800	200.00%
	72 Hours	0	0	0	0	0	0%	0.000	??
	96-Hours	0	0	0	0	0	0%	0.000	??
100%	24-Hours	0	1	0	0	0	2%	0.400	200.00%
	48-Hours	0	0	0	0	0	0%	0.000	??
	72 Hours	0	0	0	0	0	0%	0.000	??
	96-Hours	0	0	0	0	0	0%	0.000	??

TABLE 3B. Summary of Acute Evaluation Results. American Samoa Joint Cannery Outfall Effluent Evaluation. November 2006.

	SUMMARY OF ENDPOINTS			
Exposure Period	LC-50 (95% Limits)	METHOD	NOEC	LOEC
24 Hours	55.1% (50.9-59.7)	Trimmed Spearman-Karber Direct Observation	50%	75%
48 Hours	51.9% (48.0-56.2)	Trimmed Spearman-Karber	50%	75%
72 Hours	50.5% (46.7-54.4)	Trimmed Spearman-Karber Direct Observation	50%	75%
96 Hours	43.1% (39.0-47.6)	Trimmed Spearman-Karber Direct Observation	25%	50%

TABLE 4. Summary of Effluent and Diluent Characteristics. American Samoa Joint Cannery Outfall Effluent Evaluation. November 2006.

PARAMETER	UNITS	100% EFFLUENT	50% EFFLUENT	DILUENT
Salinity - As Received	‰	11	-	25
Salinity - After Salinity Adjustment	‰	25	25	-
pH - As Received	SU	6.57	-	7.70
pH - After Salinity Adjustment	SU	7.48	7.59	-
TRC - As Received	mg/L	<0.05	-	<0.05
Dissolved Oxygen - As Received	mg/L	1.6	-	-
Dissolved Oxygen - After Aeration	mg/L	7.5	7.4	1.6
Ammonia - As Received	mg/L as N	60	-	<0.1
Unionized Ammonia - As Received	mg/L as N	0.709	-	<0.002
Ammonia - Salinity Adjusted	mg/L as N	-	34	-
Unionized Ammonia - Salinity Adjusted	mg/L as N	-	0.516	-
Ammonia - at 48 Hours	mg/L as N	33	20	5.3
Unionized Ammonia - at 48 Hours	mg/L as N	2.630	0.745	0.177

TABLE 5. Summary of StarKist Samoa and COS Samoa Packing Combined Effluent Bioassay Results. American Samoa Joint Cannery Outfall Effluent Evaluation. November 2006.

Date	Species	96-Hour Endpoints		
		LC-50	NOEC	LOEC
02/93[1]	*Penaeus vannami*	4.8%	3.1%	6.25%
10/93[1]	*Penaeus vannami*	15.67%	3.1%	6.25%
02/94[1]	*Penaeus vannami*	15.76%	<1.6%	1.6%
10/94[1]	*Americamysis bahia*	31.2%	25.0%	50.0%
03/95[1]	*Penaeus vannami*	14.8%	6.25%	12.5%
03/95[1]	*Americamysis bahia*	10.8%	6.25%	12.5%
02/96[1]	*Penaeus vannami*	>50.0%	>50.0%	>50.0%
03/96[1]	*Penaeus vannami*	44.4%	25.0%	50.0%
11/96[1]	*Penaeus vannami*	7.11%	3.1%	6.25%
03/97[1]	*Penaeus vannami*	39.36%	12.5%	25.0%
09/97[1]	*Penaeus vannami*	12.3%	6.25%	12.5%
06/98[1]	*Americamysis bahia*	17.2%	6.25%	12.5%
11/98[1]	*Americamysis bahia*	15.0%	6.25%	12.5%
02/00[1]	*Americamysis bahia*	20.0%	6.25%	12.5%
08/00[1]	*Americamysis bahia*	17.1%	3.1%	6.25%
03/01[2]	*Americamysis bahia*	13.81%	12.5%	25.0%
03/02[2]	*Americamysis bahia*	16.13%	12.5%	25.0%
08/02[2]	*Americamysis bahia*	10.23%	6.25%	12.5%
03/03[2]	*Americamysis bahia*	28.4%	25.0%	50.0%
08/03[2]	*Americamysis bahia*	43.2%	25.0%	50.0%
03/04[2]	*Americamysis bahia*	>50.0%	50.0%	>50.0%
10/04[2]	*Americamysis bahia*	>50.0%	50.0%	>50.0%
03/05[2]	*Americamysis bahia*	48.5%	25.0%	50.0%
10/05[2]	*Americamysis bahia*	>50.0%	50.0%	>50.0
03/06[2]	*Americamysis bahia*	36.6%	25%	50%
11/06[2]	*Americamysis bahia*	43.1%	25%	50%

Notes:
1. Assays conducted by Advanced Biological Testing, Inc., Rohnert Park, California
2. Assays conducted by EnviroSystems, Inc., Hampton, New Hampshire

APPENDIX A

DATA SHEETS

STATISTICAL SUPPORT

Contents	Number of Pages
Methods Used in NPDES Permit Biomonitoring Testing	1
A. bahia Acute Bioassay Data Summary	3
A. bahia Survival Statistics: LC-50, NOEC	20
A. bahia Organism Culture Sheet	1
Preparation of Dilutions	1
Record of Meters Used for Water Quality Measurements	1
Unionized Ammonia Calculation	2
Sample Receipt Record	1
Chain of Custody	1
Total Appendix Pages	31

METHODS USED IN NPDES PERMIT BIOMONITORING TESTING

Parameter	Method
Acute Exposure Bioassays	
Ceriodaphnia dubia, Daphnia pulex	EPA-821-R-02-012
Pimephales promelas	EPA-821-R-02-012
Americamysis bahia	EPA-821-R-02-012
Menidia beryllina, Cyprinodon variegatus	EPA-821-R-02-012
Chronic Exposure Bioassays	
Ceriodaphnia dubia	EPA-821-R-02-013, 1002.0
Pimephales promelas	EPA-821-R-02-013, 1000.0
Cyprinodon variegatus	EPA-821-R-02-014, 1004.0
Menidia beryllina	EPA-821-R-02-014, 1006.0
Arbacia punctulata	EPA-821-R-02-014, 1008.0
Champia parvula	EPA-821-R-02-014, 1009.0
Trace Metals:	
ICP Metals	EPA 200.7/SW 6010
Hardness	Standard Methods 20th Edition - Method 2340 B
Wet Chemistries:	
Alkalinity	EPA 310.2
Chlorine, Residual	Standard Methods 20th Edition - Method 4500CLD
Total Organic Carbon	Standard Methods 20th Edition - Method 5310C
Specific Conductance	Standard Methods 20th Edition - Method 2510B
Nitrogen - Ammonia	Standard Methods 20th Edition - Method 4500NH3G
pH	Standard Methods 20th Edition - Method 4500H+B
Solids, Total (TS)	Standard Methods 20th Edition - Method 2540.B
Solids, Total Suspended (TSS)	Standard Methods 20th Edition - Method 2540D
Dissolved Oxygen	Standard Methods 20th Edition - Method 4500-O G

ACUTE BIOASSAY DATA SUMMARY

STUDY: 15231		"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES					
CLIENT: CH2M Hill	TEST ORGANISM: *A. bahia*		TRC	AMM 0 HR✖	AMM 48 HR✖	pH	DO	Salinity
SAMPLE: American Samoa	ORGANISM SUPPLIER/BATCH/AGE: *See Organism Culture Sheet*	EFFLUENT	See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet					
DILUENT: LAB SALT		DILUENT						

SALINITY ADJUSTMENT RECORD (IF APPLICABLE): ML EFFLUENT + G SEA SALTS = 100% ACTUAL PERCENTAGE

CONC	REP	SURVIVAL					✦DISSOLVED OXYGEN (MG/L)✦						PH (SU)						TEMPERATURE (°C)						SALINITY (ppt)					
		0	24	48	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48	72	96	0	24	48◊	48	72	96
LAB	A	10	10	10	9	9	7.4	8.5	7.0	6.8	7.0	7.5	7.70	7.69	7.94	7.61	7.85	7.65	20	20	20	20	20	20	25	25	28	25	26	27
	B	10	10	10	10	10	7.1	8.5	7.2	6.8	6.2	7.1	7.83	7.83	7.76	7.84	7.93	7.79	20	20	20	20	20	20	26	26	28	25	26	28
	C	10	10	10	10	10	7.1	8.4	7.2	6.8	6.8	7.1	7.80	7.90	7.71	7.89	7.90	7.83	20	20	20	20	20	20	26	26	30	26	27	28
	D	10	10	10	10	10	7.1	8.4	7.3	6.8	6.8	7.2	7.84	7.91	8.11	7.91	7.96	7.83	20	20	20	20	20	20	26	26	30	26	26	27
	E	10	10	10	10	10	7.1	8.4	7.1	6.9	7.0	7.1	7.81	7.92	8.18	7.90	7.90	7.65	20	20	20	20	20	20	26	26	30	26	27	28
6.25%	A	10	10	10	10	10	7.1	8.4	6.8	7.0	7.0	7.0	7.79	7.93	8.15	7.86	7.91	7.81	20	20	20	20	20	20	26	26	29	26	27	28
	B	10	10	10	10	10	7.1	8.4	6.8	6.9	6.9	7.0	7.80	7.83	8.23	7.88	7.90	7.83	20	20	20	20	20	20	26	26	28	25	27	28
	C	10	10	10	10	10	7.1	8.4	6.9	6.8	6.9	7.0	7.80	7.93	8.27	7.87	7.89	7.83	20	20	20	20	20	20	26	26	29	26	27	28
	D	10	10	10	10	10	7.1	8.4	7.0	6.8	6.9	7.1	7.80	7.93	8.26	7.91	7.90	7.78	20	20	20	20	20	20	26	26	29	25	27	28
	E	10	10	10	10	10	7.1	8.4	6.0	6.8	6.9	7.1	7.80	7.92	8.28	7.90	7.93	7.87	20	20	20	20	20	20	26	24	29	26	27	28
DATE		11/16	11/17	11/18	11/19	11/20	11/16	11/17	11/18	11/18	11/19	11/20																		
TIME		1450	1330	1450	1545	1330	1550	1630	1400	1515	1530	1310																		
INITIALS		CS	CS	YF	SJ	CS	CS	CS	YF	YF	SJ CS	CS																		
FED?		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓																		

✖ - See:" EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.
✦ -AERATE PRIOR TO MIXING DILUTIONS - AERATE TEST CHAMBERS FROM START!
◊ - "Old" water qualities (prior to renewal) ☆ - "New"water qualities (post renewal)

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STUDY:	SAMPLE RECEIVED:	"AS RECEIVED" EFFLUENT AND DILUENT CHEMISTRIES					
CLIENT: CH2M Hill	TEST ORGANISM: *A. bahia*		TRC	AMM 0 HR✖	AMM 48 HR✖	pH	DO	Salinity
SAMPLE: American Samoa	ORGANISM SUPPLIER:	EFFLUENT	See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet					
DILUENT: LAB SALT	ORGANISM BATCH/AGE:	DILUENT						

CONC	REP	SURVIVAL					✦DISSOLVED OXYGEN (MG/L)✦						PH (SU)						TEMPERATURE (°C)						SALINITY (ppt)					
		0	24	48	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48	72	96	0	24	48◊	48	72	96
12.5%	A	10	10	10	10	10	6.5	8.6	6.5	6.6	6.7	7.1	7.70	7.65	7.82	7.89	7.75	7.89	20	20	20	20	20	20	25	26	30	26	27	28
	B	10	10	10	10	10	7.1	8.6	6.6	6.6	6.5	7.1	7.70	7.68	7.91	7.87	7.74	7.66	20	20	20	20	20	20	25	26	29	26	27	28
	C	10	10	10	10	10	7.1	8.3	6.7	6.6	6.6	7.1	7.70	7.68	7.96	7.90	7.76	7.82	20	20	20	20	20	20	25	26	28	26	27	28
	D	10	10	10	10	10	7.1	8.3	6.9	6.6	6.6	7.1	7.69	7.68	7.98	7.91	7.77	7.94	20	20	20	20	20	20	25	26	29	26	27	28
	E	10	10	10	10	10	7.1	8.3	6.9	6.7	6.7	7.1	7.89	7.69	7.82	7.91	7.77	7.56	20	20	20	20	20	20	25	26	29	26	27	28
25%	A	10	10	10	10	8	7.1	8.5	7.0	6.5	6.7	7.3	7.71	7.60	7.90	7.88	7.87	7.95	20	20	20	20	20	20	25	26	30	26	28	28
	B	10	10	10	10	9	7.0	7.8	6.6	6.5	6.4	7.3	7.71	7.68	7.95	7.86	7.86	7.98	20	20	20	20	20	20	25	26	29	26	27	28
	C	10	10	10	10	8	7.0	7.4	5.8	6.4	6.4	7.2	7.71	7.68	7.96	7.87	7.86	7.98	20	20	20	20	20	20	25	26	28	26	27	28
	D	10	~~10~~ 9	10	10	10	7.0	7.3	6.2	6.3	6.4	7.1	7.71	7.68	8.05	7.90	7.89	7.94	20	20	20	20	20	20	25	26	28	26	27	28
	E	10	10	9	9	9	7.0	7.1	6.6	6.3	6.4	6.6	7.71	7.68	7.81	7.93	7.91	7.92	20	20	20	20	20	20	25	26	28	26	27	28
50%	A	10	10	10	10	8	7.0	6.6	6.8	6.3	6.3	6.8	7.59	7.96	7.99	7.92	8.02	8.03	20	20	20	20	20	20	25	26	28	26	27	28
	B	10	7	7	6	3	7.0	5.9	6.7	6.3	6.1	6.8	7.59	7.90	7.94	7.94	8.03	8.07	20	20	20	20	20	20	25	26	28	26	27	28
	C	10	6	6	6	4	7.0	6.4	6.8	6.4	6.2	6.6	7.59	7.95	8.08	7.95	8.04	8.12	20	20	20	20	20	20	25	26	29	26	27	28
	D	10	~~8~~ 9	9	8	5	7.0	6.4	6.8	6.3	6.2	6.7	7.59	7.90	8.11	7.94	8.04	8.09	20	20	20	20	20	20	25	26	28	26	27	28
	E	10	4	3	3	3	7.0	6.3	6.8	6.4	6.1	6.6	7.51	7.90	8.08	7.94	8.02	8.08	20	20	20	20	20	20	25	26	29	26	27	28
DATE		11/16	11/17	11/18	11/19	11/20	11/16	11/17	11/18	11/18	11/19	11/20																		
TIME		1562	1330	1450	1545	1335	1450	1430	1460	1515	1530	1320																		
INITIALS		CS	CS	YJ	SS	CS	CS	CS	YJ	YJ	SS	CS																		
FED?		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓																		

✖ - See:" EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.
✦ -AERATE PRIOR TO MIXING DILUTIONS - AERATE TEST CHAMBERS FROM START!
◊ - "Old" water qualities (prior to renewal) ☆ - "New"water qualities (post renewal)

ACUTE BIOASSAY DATA SUMMARY

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CLIENT: CH2M Hill	TEST ORGANISM: *A. bahia*		TRC	AMM 0 HR✖	AMM 48 HR✖	pH	DO	Salinity
SAMPLE: American Samoa	ORGANISM SUPPLIER:	EFFLUENT	See "EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet					
DILUENT: LAB SALT	ORGANISM BATCH/AGE:	DILUENT						

CONC	REP	SURVIVAL					✦DISSOLVED OXYGEN (MG/L)✦						PH (SU)						TEMPERATURE (°C)						SALINITY (ppt)					
		0	24	48	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48☆	72	96	0	24	48◊	48	72	96	0	24	48◊	48	72	96
75%	A	10	—	—	—	—	7.0	5.4	—	—	—	—	7.91	7.88	—	—	—	—	20	20	~~68~~	—	—	—	25	26	~~28~~	—	—	—
	B	10	—	—	—	—	7.0	5.4	—	—	—	—	7.92	7.88	—	—	—	—	20	20	~~20~~	—	—	—	25	26	~~28~~	—	—	—
	C	10	3	2	0	—	6.9	5.0	7.0	6.0	6.2	—	7.92	7.91	8.30	7.93	8.21	—	20	20	20	20	20	—	25	26	28	27	27	—
	D	10	2	0	—	—	7.0	4.4	6.8	—	—	—	7.92	7.89	8.32	—	—	—	20	20	20	—	—	—	25	26	28	—	—	—
	E	10	1	0	—	—	7.1	4.4	6.8	—	—	—	7.92	7.91	8.32	—	—	—	20	20	20	—	—	—	25	26	29	—	—	—
100%	A	10	—	—	—	—	7.1	4.9	—	—	—	—	7.98	7.95	—	—	—	—	20	20	—	—	—	—	25	26	—	—	—	—
	B	10	1	0	—	—	7.0	5.4	6.5	5.8	6.0	6.3	7.98	7.92	8.34	7.95	8.24	8.16	20	20	20	20	20	20	25	26	29	27	27	28
	C	10	—	—	—	—	7.1	5.0	—	—	—	—	7.98	7.90	—	—	—	—	20	20	—	—	—	—	25	26	—	—	—	—
	D	10	—	—	—	—	7.1	3.1	—	—	—	—	7.99	7.91	—	—	—	—	20	20	—	—	—	—	25	26	—	—	—	—
	E	10	—	—	—	—	7.07	4.4	—	—	—	—	7.98	7.91	—	—	—	—	20	20	—	—	—	—	25	26	—	—	—	—
DATE		11/16	11/17	11/18	11/19	11/20	11/16	11/17	11/18	11/18	11/19	11/20																		
TIME		1510	1350	1455	1450	1318	1450	1430	1480	1515	1530	1528																		
INITIALS		CS	CS	[illegible]	SJ	CS	CS	CS	[illegible]	[illegible]	SJ	CS																		
FED?		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓																		

✖ - See:" EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA" sheet.
✦ -AERATE PRIOR TO MIXING DILUTIONS - AERATE TEST CHAMBERS FROM START!
◊ - "Old" water qualities (prior to renewal) ☆ - "New"water qualities (post renewal)

KEEP @ 20°

CETIS Test Summary

Report Date: 21 Nov-06 9:12 PM
Link: 06-1931-8785

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Test No:	02-8774-5143	**Test Type:**	Survival (96h)	**Duration:**	95h
Start Date:	16 Nov-06 02:50 PM	**Protocol:**	EPA/821/R-02-012 (2002)	**Species:**	Americamysis bahia
Ending Date:	20 Nov-06 01:30 PM	**Dil Water:**	Laboratory Seawater	**Source:**	ARO - Aquatic Research Organisms, N
Setup Date:	16 Nov-06 02:50 PM	**Brine:**	Generic commercial salts		

Sample No:	13-8429-9146	**Material:**	Food Processing Effluent	**Client:**	CH2M Hill
Sample Date:	08 Nov-06 12:00 PM	**Code:**	15231	**Project:**	Fourth Quarter WET Compliance Test
Receive Date:	16 Nov-06 12:00 PM	**Source:**	CH2M Hill- American Samoa		
Sample Age:	8d 2h (17.6 °C)	**Station:**	Joint Cannery Outfall		

Comparison Summary

Analysis	Endpoint	NOEL	LOEL	ChV	MSDp	Method
15-1861-6061	24h Proportion Survived	50	75	61.237	12.49%	Steel's Many-One Rank
05-3366-0403	48h Proportion Survived	50	75	61.237	13.57%	Steel's Many-One Rank
12-3031-9286	72h Proportion Survived	50	75	61.237	13.65%	Steel's Many-One Rank
13-2392-7726	96h Proportion Survived	25	50	35.355	10.03%	Steel's Many-One Rank
15-3946-9841		25	50	35.355	10.03%	Steel's Many-One Rank

Point Estimate Summary

Analysis	Endpoint	% Effect	Conc-%	95% LCL	95% UCL	Method
05-8103-0502	24h Proportion Survived	50	57.41013	53.16588	61.33142	Linear Regression
15-6516-5191	24h Proportion Survived	50	55.08024	50.85098	59.66126	Trimmed Spearman-Karber
13-5582-5949	48h Proportion Survived	50	53.20215	39.83447	62.59899	Linear Regression
11-6781-2753	48h Proportion Survived	50	51.93348	48.00367	56.18501	Trimmed Spearman-Karber
07-1526-2296	72h Proportion Survived	50	50.45696	46.72910	54.48220	Trimmed Spearman-Karber
06-6921-1005	96h Proportion Survived	50	43.53077	38.96288	47.80206	Linear Regression
13-8136-4302	96h Proportion Survived	50	43.07151	38.98845	47.58219	Trimmed Spearman-Karber

Test Acceptability

Analysis	Endpoint	Attribute	Statistic	Acceptable Range	Decision
06-6921-1005	96h Proportion Survived	Control Response	0.98	0.9 - N/A	Passes acceptability criteria
13-2392-7726	96h Proportion Survived	Control Response	0.98	0.9 - N/A	Passes acceptability criteria
13-8136-4302	96h Proportion Survived	Control Response	0.98	0.9 - N/A	Passes acceptability criteria
15-3946-9841	96h Proportion Survived	Control Response	0.98	0.9 - N/A	Passes acceptability criteria

CETIS Test Summary

Report Date: 21 Nov-06 9:12 PM
Link: 06-1931-8785

24h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
50		5	0.72000	0.40000	1.00000	0.10677	0.23875	33.16%
75		5	0.12000	0.00000	0.30000	0.05831	0.13038	108.65
100		5	0.02000	0.00000	0.10000	0.02000	0.04472	223.61

48h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
25		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
50		5	0.70000	0.30000	1.00000	0.12247	0.27386	39.12%
75		5	0.04000	0.00000	0.20000	0.04000	0.08944	223.61
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

72h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
25		5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
50		5	0.66000	0.30000	1.00000	0.11662	0.26077	39.51%
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

96h Proportion Survived Summary

Conc-%	Control Type	Reps	Mean	Minimum	Maximum	SE	SD	CV
0	Lab Water	5	0.98000	0.90000	1.00000	0.02000	0.04472	4.56%
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	0.00%
25		5	0.88000	0.80000	1.00000	0.03742	0.08367	9.51%
50		5	0.50000	0.30000	0.80000	0.08367	0.18708	37.42%
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0.00%

CETIS Test Summary

Report Date: 21 Nov-06 9:12 PM
Link: 06-1931-8785

24h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	1.00000	1.00000	1.00000	1.00000
25		1.00000	1.00000	1.00000	1.00000	1.00000
50		1.00000	0.70000	0.60000	0.90000	0.40000
75		0.00000	0.00000	0.30000	0.20000	0.10000
100		0.00000	0.10000	0.00000	0.00000	0.00000

48h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	1.00000	1.00000	1.00000	1.00000
25		1.00000	1.00000	1.00000	1.00000	0.90000
50		1.00000	0.70000	0.60000	0.90000	0.30000
75		0.00000	0.00000	0.20000	0.00000	0.00000
100		0.00000	0.00000	0.00000	0.00000	0.00000

72h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	0.90000	1.00000	1.00000	1.00000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	1.00000	1.00000	1.00000	1.00000
25		1.00000	1.00000	1.00000	1.00000	0.90000
50		1.00000	0.60000	0.60000	0.80000	0.30000
75		0.00000	0.00000	0.00000	0.00000	0.00000
100		0.00000	0.00000	0.00000	0.00000	0.00000

96h Proportion Survived Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
0	Lab Water	0.90000	1.00000	1.00000	1.00000	1.00000
6.25		1.00000	1.00000	1.00000	1.00000	1.00000
12.5		1.00000	1.00000	1.00000	1.00000	1.00000
25		0.80000	0.90000	0.80000	1.00000	0.90000
50		0.80000	0.30000	0.40000	0.50000	0.50000
75		0.00000	0.00000	0.00000	0.00000	0.00000
100		0.00000	0.00000	0.00000	0.00000	0.00000

CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
48h Proportion Survived	Comparison	06-1931-8785	06-1931-8785	21 Nov-06 9:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		50	75	2.00	61.237	13.57%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	9.04822	3.89507	0.00006	Unequal Variances
Distribution	Shapiro-Wilk W	0.75923	0.89981	0.00000	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	5.698237	1.139647	5	53.18	0.00000	Significant Effect
Error	0.5143614	0.0214317	24			
Total	6.21259886	1.1610792	29			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Water		6.25	27.5	16	> 0.0500	1	Non-Significant Effect
		12.5	27.5	16	> 0.0500	1	Non-Significant Effect
		25	25	16	> 0.0500	1	Non-Significant Effect
		50	17.5	16	> 0.0500	1	Non-Significant Effect
		75	15	16	<= 0.0500	2	Significant Effect

Data Summary

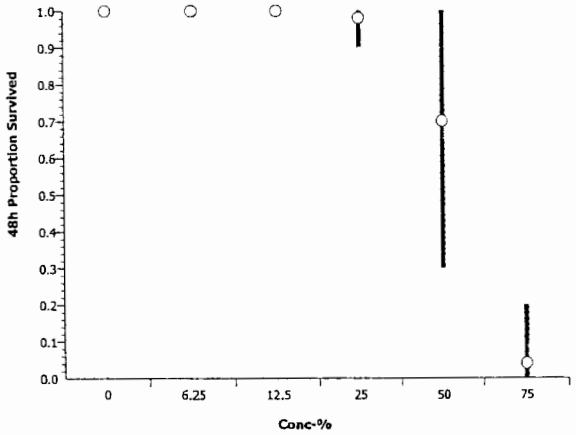
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
6.25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
12.5		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
25		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
50		5	0.70000	0.30000	1.00000	0.27386	1.02359	0.57964	1.41202	0.32356
75		5	0.04000	0.00000	0.20000	0.08944	0.21975	0.15878	0.46365	0.13634

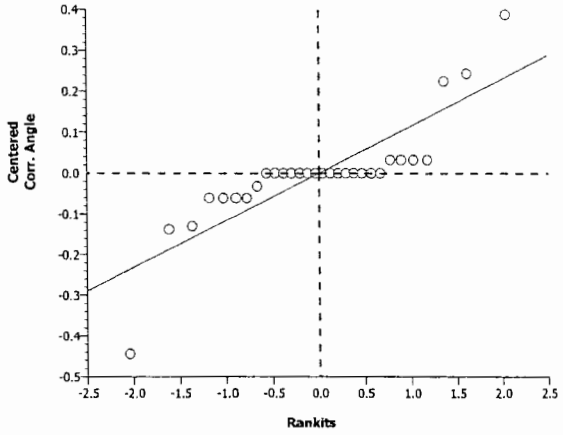
Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	1.00000					
12.5		1.00000	1.00000	1.00000	1.00000	1.00000					
25		1.00000	1.00000	1.00000	1.00000	0.90000					
50		1.00000	0.70000	0.60000	0.90000	0.30000					
75		0.00000	0.00000	0.20000	0.00000	0.00000					

CETIS Analysis Detail

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
72h Proportion Survived	Comparison	06-1931-8785	06-1931-8785	21 Nov-06 9:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		50	75	2.00	61.237	13.65%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	5.90270	4.43069	0.00264	Unequal Variances
Distribution	Shapiro-Wilk W	0.73563	0.88746	0.00001	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	0.7160529	0.1790132	4	8.46	0.00036	Significant Effect
Error	0.4230623	0.0211531	20			
Total	1.13911527	0.2001664	24			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Water		6.25	30	17	> 0.0500	1	Non-Significant Effect
		12.5	30	17	> 0.0500	1	Non-Significant Effect
		25	27.5	17	> 0.0500	2	Non-Significant Effect
		50	18	17	> 0.0500	2	Non-Significant Effect

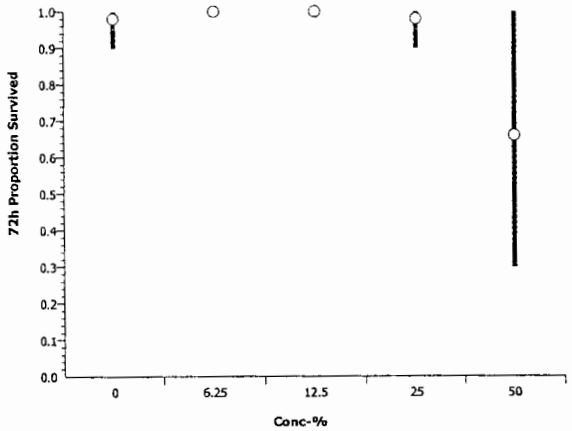
Data Summary

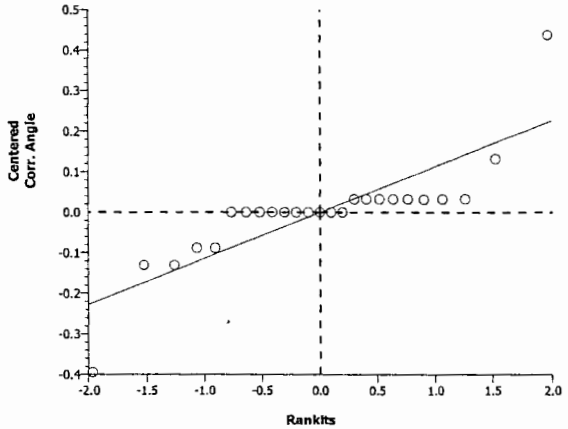
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
6.25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
12.5		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
25		5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
50		5	0.66000	0.30000	1.00000	0.26077	0.97419	0.57964	1.41202	0.30845

Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	0.90000	1.00000	1.00000	1.00000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	1.00000					
12.5		1.00000	1.00000	1.00000	1.00000	1.00000					
25		1.00000	1.00000	1.00000	1.00000	0.90000					
50		1.00000	0.60000	0.60000	0.80000	0.30000					

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
96h Proportion Survived	Comparison	06-1931-8785	06-1931-8785	21 Nov-06 9:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		25	50	4.00	35.355	10.03%

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.98	0.9 - N/A	Passes acceptability criteria

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	4.98442	4.43069	0.00594	Unequal Variances
Distribution	Shapiro-Wilk W	0.79951	0.88746	0.00012	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	1.413387	0.3533468	4	29.31	0.00000	Significant Effect
Error	0.241106	0.0120553	20			
Total	1.65449303	0.3654021	24			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Water		6.25	30	17	> 0.0500	1	Non-Significant Effect
		12.5	30	17	> 0.0500	1	Non-Significant Effect
		25	19	17	> 0.0500	3	Non-Significant Effect
		50	15	17	<= 0.0500	2	Significant Effect

Data Summary

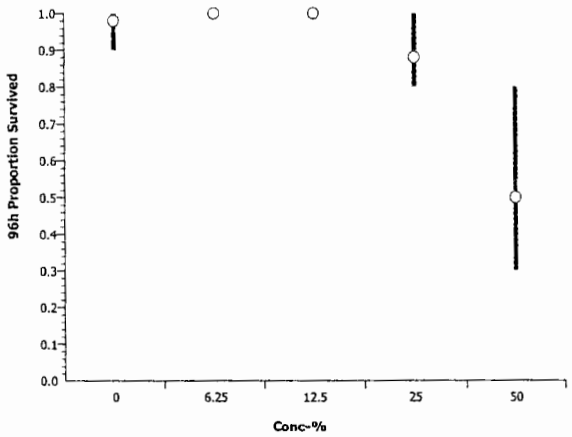
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	0.98000	0.90000	1.00000	0.04472	1.37942	1.24905	1.41202	0.07288
6.25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
12.5		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
25		5	0.88000	0.80000	1.00000	0.08367	1.22488	1.10715	1.41202	0.12640
50		5	0.50000	0.30000	0.80000	0.18708	0.78846	0.57964	1.10715	0.19745

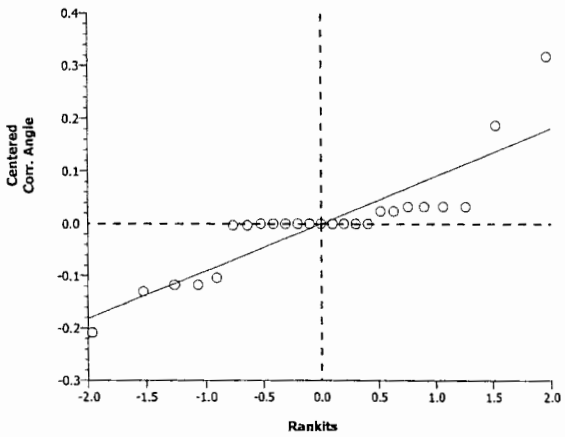
Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	0.90000	1.00000	1.00000	1.00000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	1.00000					
12.5		1.00000	1.00000	1.00000	1.00000	1.00000					
25		0.80000	0.90000	0.80000	1.00000	0.90000					
50		0.80000	0.30000	0.40000	0.50000	0.50000					

CETIS Analysis Detail

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
24h Proportion Survived	Comparison	06-1931-8785	06-1931-8785	21 Nov-06 9:12 PM	CETISv1.026

Method	Alt H	Data Transform	Z	NOEL	LOEL	Toxic Units	ChV	MSDp
Steel's Many-One Rank	C > T	Angular (Corrected)		50	75	2.00	61.237	12.49%

ANOVA Assumptions

Attribute	Test	Statistic	Critical	P Level	Decision(0.01)
Variances	Modified Levene	19.01480	3.52756	0.00000	Unequal Variances
Distribution	Shapiro-Wilk W	0.79103	0.91004	0.00001	Non-normal Distribution

ANOVA Table

Source	Sum of Squares	Mean Square	DF	F Statistic	P Level	Decision(0.05)
Between	8.840754	1.473459	6	83.48	0.00000	Significant Effect
Error	0.4942097	0.0176504	28			
Total	9.33496323	1.4911092	34			

Group Comparisons

Control	vs	Conc-%	Statistic	Critical	P Level	Ties	Decision(0.05)
Lab Water		6.25	27.5	16	> 0.0500	1	Non-Significant Effect
		12.5	27.5	16	> 0.0500	1	Non-Significant Effect
		25	27.5	16	> 0.0500	1	Non-Significant Effect
		50	17.5	16	> 0.0500	1	Non-Significant Effect
		75	15	16	<= 0.0500	2	Significant Effect
		100	15	16	<= 0.0500	2	Significant Effect

Data Summary

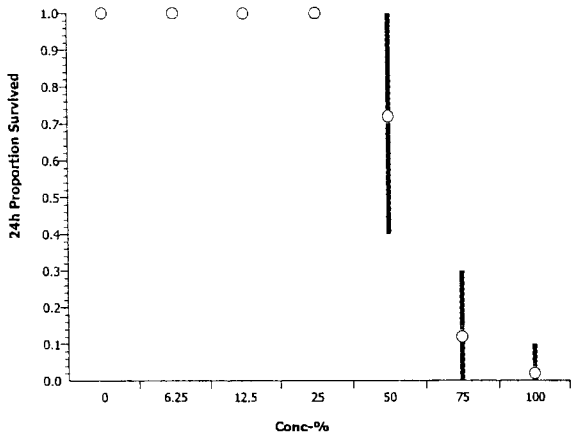
			Original Data				Transformed Data			
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SD	Mean	Minimum	Maximum	SD
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
6.25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
12.5		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
25		5	1.00000	1.00000	1.00000	0.00000	1.41202	1.41202	1.41202	0.00026
50		5	0.72000	0.40000	1.00000	0.23875	1.04460	0.68472	1.41202	0.28909
75		5	0.12000	0.00000	0.30000	0.13038	0.33652	0.15878	0.57964	0.18619
100		5	0.02000	0.00000	0.10000	0.04472	0.19137	0.15878	0.32175	0.07288

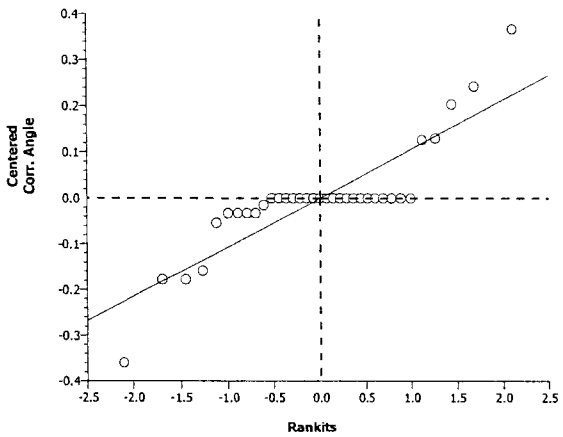
Data Detail

Conc-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Lab Water	1.00000	1.00000	1.00000	1.00000	1.00000					
6.25		1.00000	1.00000	1.00000	1.00000	1.00000					
12.5		1.00000	1.00000	1.00000	1.00000	1.00000					
25		1.00000	1.00000	1.00000	1.00000	1.00000					
50		1.00000	0.70000	0.60000	0.90000	0.40000					
75		0.00000	0.00000	0.30000	0.20000	0.10000					
100		0.00000	0.10000	0.00000	0.00000	0.00000					

CETIS Analysis Detail

Graphics





CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
24h Proportion Survived	Linear Regression	06-1931-8785	06-1931-8785	21 Nov-06 9:11 PM	CETISv1.026

Linear Regression Options

Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.
Log-Normal	Control Threshold	0	Yes	Yes	No	No

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)
Slope	9.37093	1.29079	6.84099	11.90087	7.260	0.00191	Significant
Intercept	-11.48335	2.31281	-16.01647	-6.95024	-4.965	0.00768	Significant

Regression Summary

Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)
5	-24.62203	-1.22542	0.10671	0.07289	24.06445	41.33714	0.67813	Non-Significant Heterogeneity

Residual Analysis

Attribute	Method	Statistic	Critical	P Level	Decision(0.05)
Variances	Modified Levene	3.58441	2.52766	0.01178	Unequal Variances
Distribution	Shapiro-Wilk W	0.82077	0.92671	0.00011	Non-normal Distribution

Point Estimates

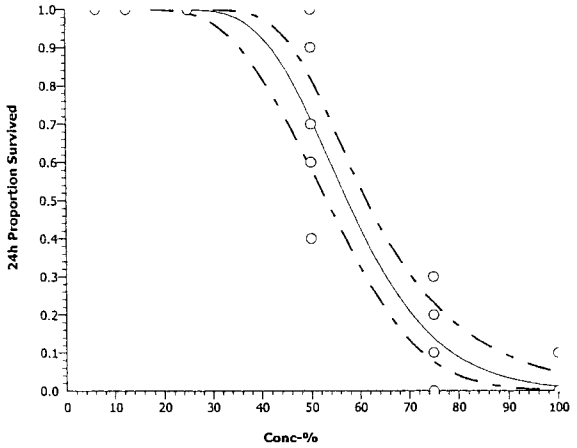
% Effect	Conc-%	95% LCL	95% UCL
50	57.41013	53.16588	61.33142

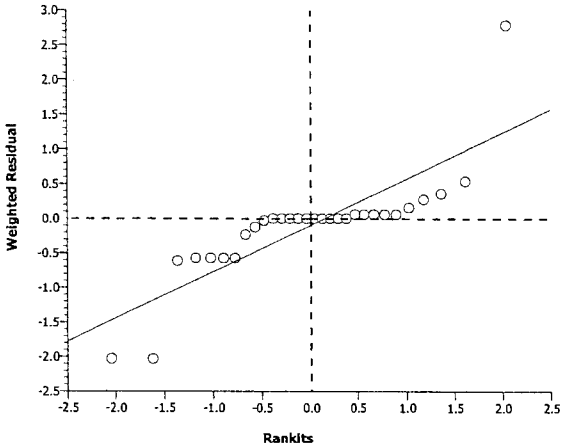
Data Summary

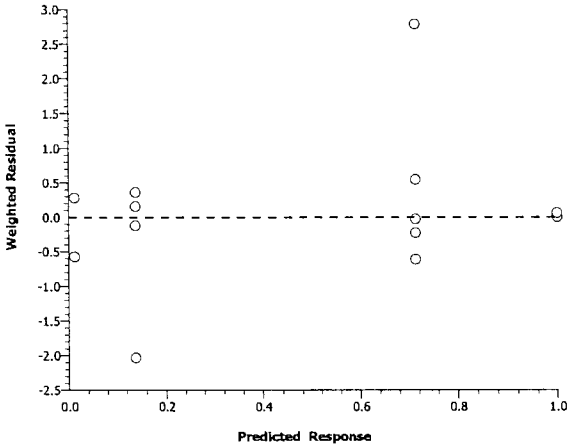
			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
50		5	0.72000	0.40000	1.00000	0.04873	0.23875	36	50
75		5	0.12000	0.00000	0.30000	0.02661	0.13038	6	50
100		5	0.02000	0.00000	0.10000	0.00913	0.04472	1	50

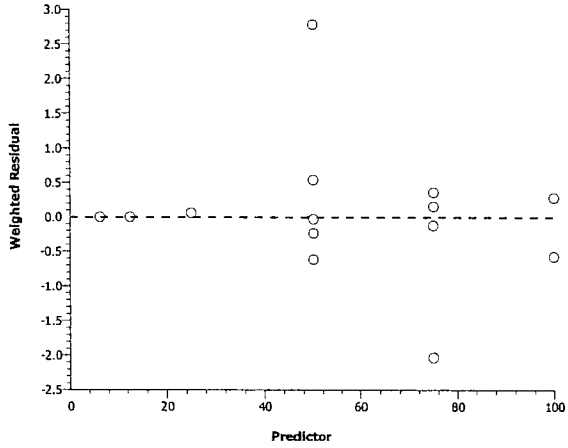
CETIS Analysis Detail

Graphics









CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
96h Proportion Survived	Linear Regression	06-1931-8785	06-1931-8785	21 Nov-06 9:11 PM	CETISv1.026

Linear Regression Options

Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.
Log-Normal	Control Threshold	0.02	Yes	Yes	No	No

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)
Threshold	0.00854	0.00754	-0.00624	0.02333	1.133	0.32062	Not Significant
Slope	6.53362	0.78549	4.99405	8.07318	8.318	0.00114	Significant
Intercept	-5.70727	1.34135	-8.33631	-3.07823	-4.255	0.01311	Significant

Regression Summary

Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)
10	-18.86726	-0.87352	0.15305	0.05552	23.08905	41.33714	0.72857	Non-Significant Heterogeneity

Residual Analysis

Attribute	Method	Statistic	Critical	P Level	Decision(0.05)
Variances	Modified Levene	2.59015	2.52766	0.04575	Unequal Variances
Distribution	Shapiro-Wilk W	0.59985	0.92671	0.00000	Non-normal Distribution

Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.98	0.9 - N/A	Passes acceptability criteria

Point Estimates

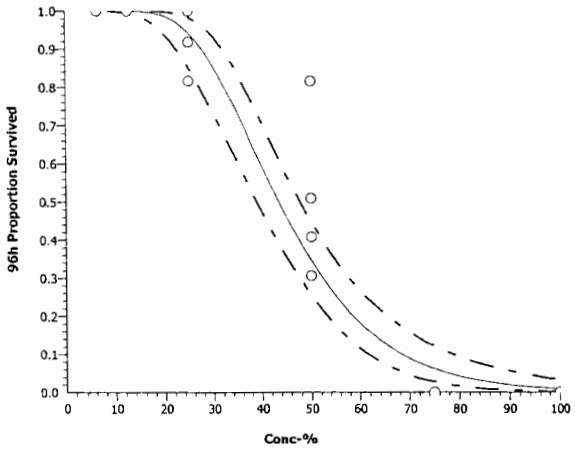
% Effect	Conc-%	95% LCL	95% UCL
50	43.53077	38.96288	47.80206

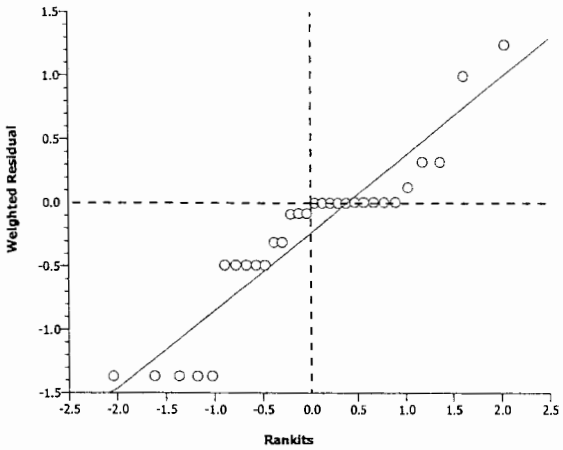
Data Summary

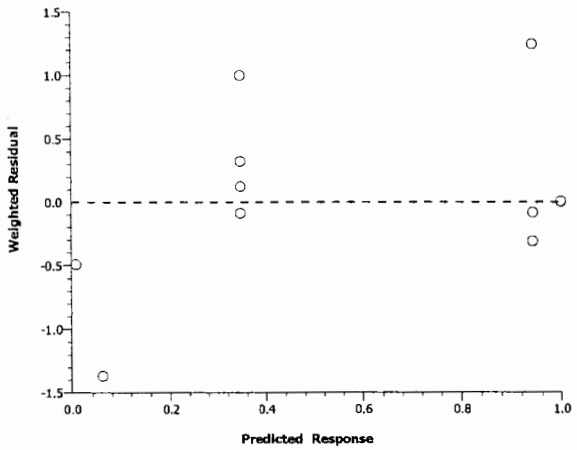
			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	0.88000	0.80000	1.00000	0.01708	0.08367	44	50
50		5	0.50000	0.30000	0.80000	0.03819	0.18708	25	50
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50

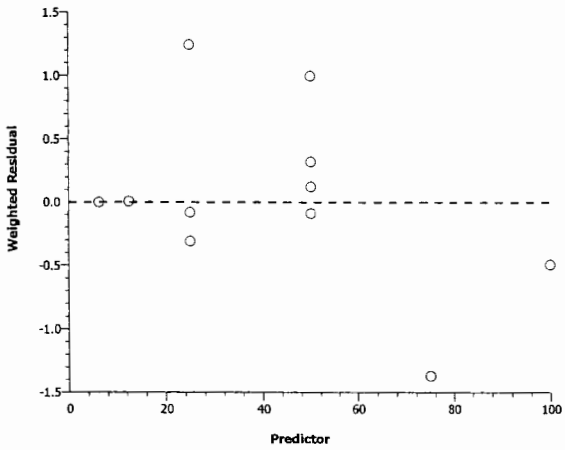
CETIS Analysis Detail

Graphics









CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
48h Proportion Survived	Linear Regression	06-1931-8785	06-1931-8785	21 Nov-06 9:11 PM	CETISv1.026

Linear Regression Options

Model	Threshold Option	Lower Threshold	Threshold Optimized	Reweighted	Pooled Groups	Heterogeneity Corr.
Log-Normal	Control Threshold	0	Yes	Yes	No	Yes

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Statistic	P Level	Decision(0.05)
Slope	9.36545	2.98562	3.24968	15.48123	3.137	0.03495	Significant
Intercept	-11.16411	5.27242	-21.96417	-0.36405	-2.117	0.10163	Not Significant

Regression Summary

Iters	Log Likelihood	Mu	Sigma	G Stat	Chi-Sq	Critical	P Level	Decision(0.05)
9	-24.90264	-1.19205	0.10678	0.42643	129.27170	41.33714	0.00000	Significant Heterogeneity

Residual Analysis

Attribute	Method	Statistic	Critical	P Level	Decision(0.05)
Variances	Modified Levene	2.44464	2.52766	0.05629	Equal Variances
Distribution	Shapiro-Wilk W	0.66176	0.92671	0.00000	Non-normal Distribution

Point Estimates

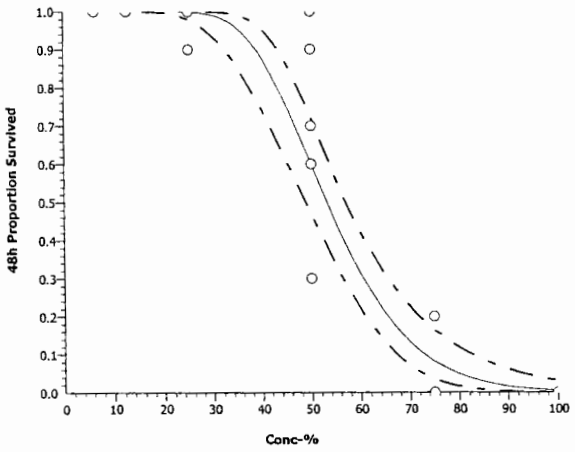
% Effect	Conc-%	95% LCL	95% UCL
50	53.20215	39.83447	62.59899

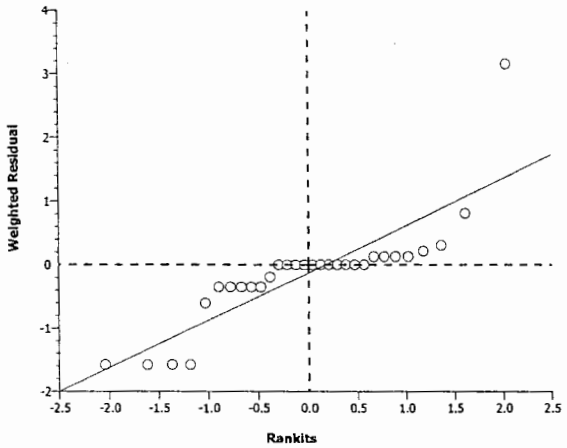
Data Summary

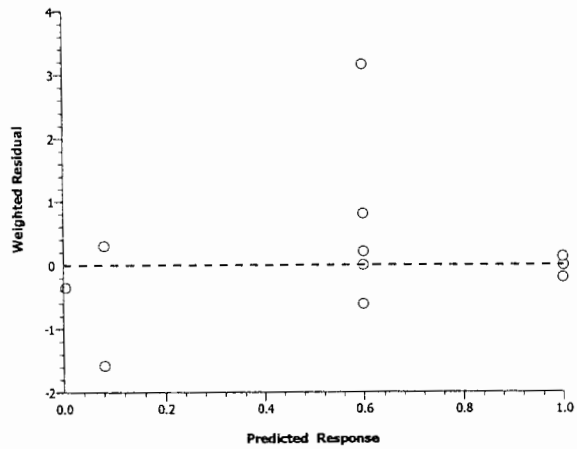
			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
50		5	0.70000	0.30000	1.00000	0.05590	0.27386	35	50
75		5	0.04000	0.00000	0.20000	0.01826	0.08944	2	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50

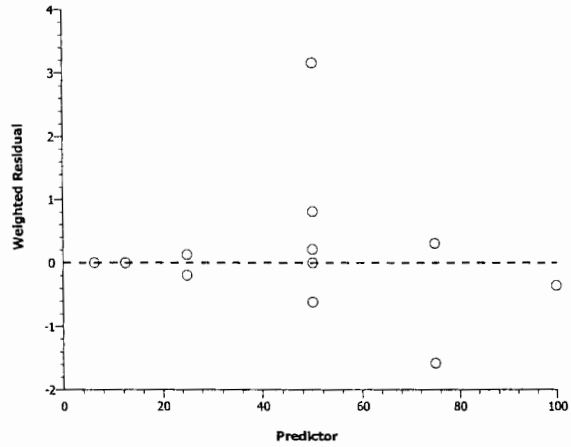
CETIS Analysis Detail

Graphics









CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — **EnviroSystems, Inc.**

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
24h Proportion Survived	Trimmed Spearman-Karber	06-1931-8785	06-1931-8785	21 Nov-06 9:11 PM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0	2.00%	1.740996	0.01734829

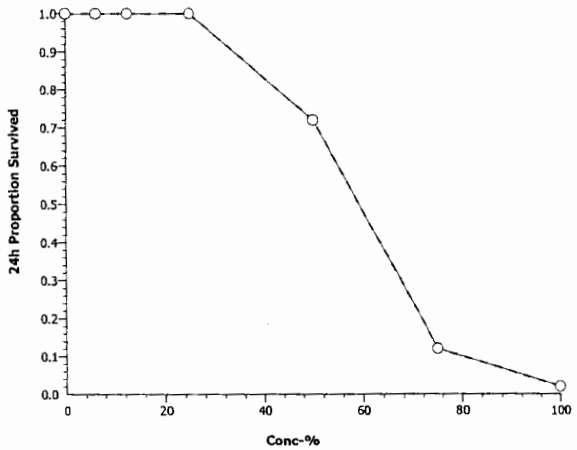
Point Estimates

EC50/LC50	95% LCL	95% UCL
55.08024	50.85098	59.66126

Data Summary

			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
50		5	0.72000	0.40000	1.00000	0.04873	0.23875	36	50
75		5	0.12000	0.00000	0.30000	0.02661	0.13038	6	50
100		5	0.02000	0.00000	0.10000	0.00913	0.04472	1	50

Graphics



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
48h Proportion Survived	Trimmed Spearman-Karber	06-1931-8785	06-1931-8785	21 Nov-06 9:11 PM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0	0.00%	1.715447	0.0170865

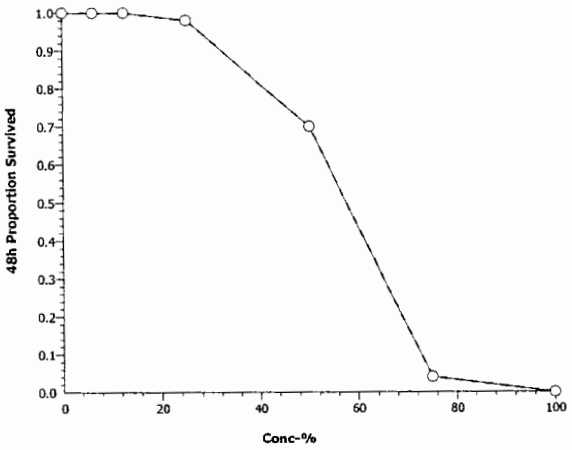
Point Estimates

EC50/LC50	95% LCL	95% UCL
51.93348	48.00367	56.18501

Data Summary

			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
50		5	0.70000	0.30000	1.00000	0.05590	0.27386	35	50
75		5	0.04000	0.00000	0.20000	0.01826	0.08944	2	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50

Graphics



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
72h Proportion Survived	Trimmed Spearman-Karber	06-1931-8785	06-1931-8785	21 Nov-06 9:11 PM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0.02	0.00%	1.702921	0.0166668

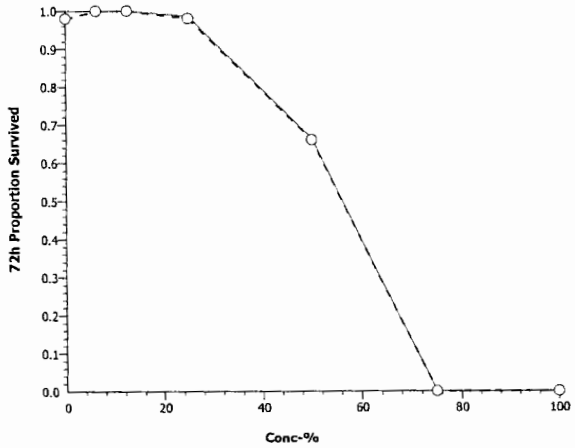
Point Estimates

EC50/LC50	95% LCL	95% UCL
50.45696	46.72910	54.48220

Data Summary

			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
50		5	0.66000	0.30000	1.00000	0.05323	0.26077	33	50
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50

Graphics



CETIS Analysis Detail

Americamysis 96-h Acute Survival Test — EnviroSystems, Inc.

Endpoint	Analysis Type	Sample Link	Control Link	Date Analyzed	Version
96h Proportion Survived	Trimmed Spearman-Karber	06-1931-8785	06-1931-8785	21 Nov-06 9:11 PM	CETISv1.026

Spearman-Karber Options

Threshold Option	Lower Threshold	Trim Level	Mu	Sigma
Control Threshold	0.02	0.00%	1.63419	0.02162712

Point Estimates

EC50/LC50	95% LCL	95% UCL
43.07151	38.98845	47.58219

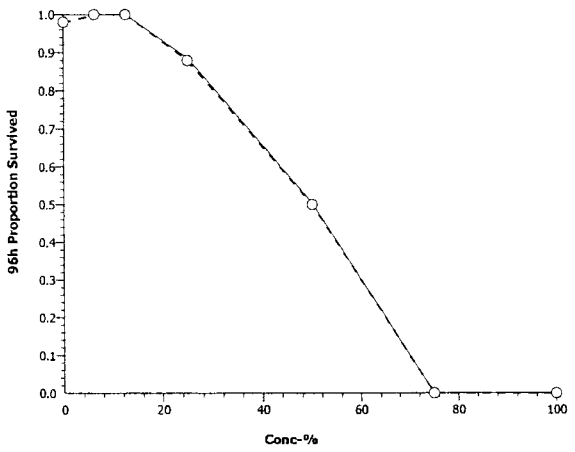
Test Acceptability

Attribute	Statistic	Acceptable Range	Decision
Control Response	0.98	0.9 - N/A	Passes acceptability criteria

Data Summary

			Calculated Variate(A/B)						
Conc-%	Control Type	Count	Mean	Minimum	Maximum	SE	SD	A	B
0	Lab Water	5	0.98000	0.90000	1.00000	0.00913	0.04472	49	50
6.25		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
12.5		5	1.00000	1.00000	1.00000	0.00000	0.00000	50	50
25		5	0.88000	0.80000	1.00000	0.01708	0.08367	44	50
50		5	0.50000	0.30000	0.80000	0.03819	0.18708	25	50
75		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50
100		5	0.00000	0.00000	0.00000	0.00000	0.00000	0	50

Graphics



Aquatic Research Organisms

DATA SHEET

I. Organism History

Species: AMERICAMYSIS BAHIA

Source: Lab reared_____ Hatchery reared_____ Field collected_____

Hatch date 11-14-06 Receipt date_____

Lot number 111406MS Strain_____

Brood Origination FLORIDA

II. Water Quality

Temperature 25 °C Salinity ~30 ppt DO —

pH 7.8 Hardness — ppm

III. Culture Conditions

System: RECIRC

Diet: Flake Food ✓ Phytoplankton_____ Trout Chow ✓

Brine Shrimp ✓ Rotifers_____ Other Encap. Shrimp Diet

Prophylactic Treatments:_____

Comments:_____

_____

IV. Shipping Information

Client: EST # of Organisms: ~~2401~~ 590+

Carrier:_____ Date Shipped: 11-16-06

Biologist: Mark Rosenquist

1 - 800 - 927 - 1650

PO Box 1271 • One Lafayette Road • Hampton, NH 03842 • (603) 926-1650

EFFLUENT & DILUENT CHEMISTRY and WATER QUALITY DATA

PARAMETER	100% Effluent	50% Effluent	Diluent - Lab Salt
TRC	<0.05		<0.05
As Received - pH (SU) @ 20°C	6.57		7.70
As Received - Salinity (ppt)	10.7		25
As Received - Dissolved Oxygen (mg/L)‡	1.6		~~1.6~~ (E3) 7.1
As Received - Ammonia (pull)	-002		15206-016
Salinity Adjusted - pH (SU) @ 20°C	7.48	7.59	
Salinity Adjusted - Salinity (ppt)	25.3	25	
After Aeration - Dissolved Oxygen (mg/L)	7.5	7.4	
Salinity Adjusted - Ammonia (pull)		-003	
48 hour Ammonia (pull)	-004	-005	~~-00015206~~ (E3) ~~023~~
48 hour pH (SU) @ 20°C	7.61	7.92	7.95

‡ - Aerate prior to mixing concentrations.

PREPARATION OF DILUTIONS

STUDY: 15231 | CLIENT: CH2M HILL - American Samoa

SPECIES: *A. bahia*

Diluent: Lab Salt	Day: 1 Sample: EGA		Day: 2 Sample: EO	
Concentration	Vol. Eff.	Final Vol	Vol. Eff.	Final Vol
LAB	0	1000	0	750
6.25%	62.5		46.9	
12.5%	125		93.75	
25%	250		187.5	
50%	500		375	
75%	750		562.5	
100%	1000		750	

HRS	Date	Time	Initials
0			
48	11/18/08	1415	yr

Comments:

AERATE SAMPLE PRIOR TO MIXING DILUTIONS AT START AND 48 HOURS.

RECORD OF METERS USED FOR WATER QUALITY MEASUREMENTS

STUDY: 15231	CLIENT: CH2M HILL - American Samoa					
WATER QUALITIES - A. bahia						
HOURS:	0	24	48 - old	48 - new	72	96
Water Quality Station #	1	2	2	2	2	2
Initials	CS	CS	yh	yh	SJ	CS
Date	11/16/06	11/17/06	11/18/06	11/18/06	11/19/06	11/20/06

Water Quality Station #1		Water Quality Station #2		COMMENTS
DO meter #	5	DO meter #	19	
DO probe #	13	DO probe #	2	
pH meter #	4 1097	pH meter #	470	
pH probe #	44	pH probe #	48	
S/C meter #	YSI30C	S/C meter #	YSI30C	
S/C probe #	↓	S/C probe #	↓	
Salinity meter #	↓	Salinity meter #	↓	

Report No: 15231 SDG:
Project: Joint Cannery Outfall

Sample ID: Effluent Start 100%
Matrix: Water
Sampled: 11/08/06 0700

Parameter		Result	Quant Limit	Units	Date Prepared	Date of Analysis	Method/Reference
Ammonia-N	15231-003	60	0.2	mg/L as N	11/30/06	11/30/06	SM 4500-NH3 G
Sample ID:	Effluent Start 50%						
Sampled:	11/08/06 0700						
Ammonia-N	15231-003	34	0.2	mg/L as N	12/02/06	12/02/06	SM 4500-NH3 G
Sample ID:	Effluent 48HR 100% - 11/18/06						
Sampled:	11/18/06						
Ammonia-N	15231-004	33	0.5	mg/L as N	12/12/06	12/12/06	SM 4500-NH3 G
Sample ID:	Effluent 48HR 50% - 11/18/06						
Sampled:	11/18/06						
Ammonia-N	15231-005	20	0.5	mg/L as N	12/12/06	12/12/06	SM 4500-NH3 G
Sample ID:	Lab Control - 11/18/06						
Sampled:	11/18/06						
Ammonia-N	15231-006	5.3	0.1	mg/L as N	12/12/06	12/12/06	SM 4500-NH3 G

STUDY: 15231
CLIENT: CH2MHill - American Samoa
PROJECT: Wastewater Treatment Plant
TASK: Unionized Ammonia Calculations

Day / Date	Treatment	Temperature Deg C	Sample pH SU	NH3 mg/L	Unionized NH3 mg/L
Day 0	Lab Diluent	20	7.70	0.10	0.002
	50% Effluent	20	7.59	34.0	0.516
	100% Effluent	20	7.48	60.0	0.709
Day 2	Lab Diluent	20	7.94	5.3	0.177
	50% Effluent	20	7.99	20.0	0.745
	100% Effluent	20	8.34	33.0	2.630

ESI

EnviroSystems, Inc.
One Lafayette Road
P.O. Box 778
Hampton, NH 03843-0778
Telephone: 603-926-3345

SAMPLE RECEIPT RECORD

ESI STUDY NUMBER: 15231 CLIENT: American Samoa

SAMPLE RECEIPT:
DATE: 11/16/06 TIME: 1200 BY: CS

DELIVERED VIA: ☐ FEDEX ☐ CLIENT ☐ ESI ☐ UPS ☑ OTHER

LOGGED INTO LAB:
DATE: 11/16 TIME: 1320 BY: CS

SAMPLE CONDITION:

CHAIN OF CUSTODY:	☑ YES	☐ NO
CHAIN OF CUSTODY SIGNED:	☑ YES	☐ NO
CHAIN OF CUSTODY COMPLETE:	☐ YES	☑ NO
SAMPLE DATE:	☑ YES	☐ NO
SAMPLE TIME RECORDED:	☐ YES	☑ NO
SAMPLE TYPE IDENTIFIED:	☑ YES	☐ NO
CUSTODY SEAL IN PLACE:	☑ YES	☐ NO
SHIPPING CONTAINER INTACT:	☑ YES	☐ NO

SAMPLE TEMPERATURE (AT ARRIVAL): 17.6 °C

DOES CLIENT NEED NOTIFICATION OF TEMPERATURE? ☐ YES ☑ NO

SAMPLE ARRIVED ON ICE: ☑ YES ☐ NO

COMMENTS:

CH2M HILL

APPLIED SCIENCES LABORATORY

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M Hill Project #: 147323.JC.06.TW
Purchase Order #: PHONE
Project Name: JOINT CANNERY OUTFALL
Company Name/CH2M HILL Office: CH2M HILL — PO BOX 1238, TRINIDAD, CA 95570
Project Manager & Phone #: Mr. [ ] Ms. [ ] Dr. [ ] STEVE COSTA 707-677-0123
Report Copy to: SAME
Requested Completion Date:
Sampling Requirements: SDWA [ ] NPDES [X] RCRA [ ] OTHER ____
Sample Disposal: Dispose [X] Return [ ]

LAB TEST CODES

SHADED AREA-- FOR LAB USE ONLY
Lab 1 #
Lab 2 #
Quote #
Kit Request #
Project #
No. of Samples
Page of
Login
LIMS Ver

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	Matrix AIR	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	ANALYSES REQUESTED: 96-HR MYSID ACUTE BIOASSAY	REMARKS	LAB 1 ID	LAB 2 ID
7-8 NOV 2006		X		X			JCO-06TW	1	X	100-50-25-12.5 (13) 6.25 - [illegible]% AS BEFORE		

Sampled By & Title: [illegible] (Please sign and print name) — Date/Time: 7-8 NOV 06
Relinquished By: [illegible] (Please sign and print name) — Date/Time: 9 NOV 06
QC Level: 1 2 3 Other: ____
Received By: [illegible] (Please sign and print name) — Date/Time: 11/16/06 1200
Relinquished By (Please sign and print name) — Date/Time
COC Rec | ICE
Received By (Please sign and print name) — Date/Time
Relinquished By (Please sign and print name) — Date/Time
Ana Req | TEMP
Cust Seal | Ph
Received By (Please sign and print name) — Date/Time
Shipped Via: UPS BUS Fed-Ex Hand Other DHL — Shipping # 782-0788-4411
Work Authorized By (Please sign and print name) — Remarks: NOTE SOP FOR AERATION PROTOCOL

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: Original - LAB, Yellow - LAB, Pink - Client

REV 3/94 FORM 340

TECHNICAL MEMORANDUM

CH2MHILL

EFFLUENT METALS TESTING – COS SAMOA PACKING NOVEMBER 2006 SAMPLING

Prepared For: COS Samoa Packing (NPDES Permit AS0000027)

Prepared By: Steve Costa
Karen Glatzel

Date: 2 April 2007

Distribution: Carl Goldstein
United States Environmental Protection Agency, Region 9
Peter Peshut
American Samoa Environmental Protection Agency

Purpose

In November 2006 metals analysis was conducted on effluent grab samples from the Chicken of the Sea Samoa Packing (COS) final effluent collected before it enters the Joint Cannery Outfall (JCO), which is shared with StarKist Samoa (SKS). Effluent grab samples were collected at the same time as the flow weighted composite sample for the semi-annual toxicity test on the combined JCO effluent discharge. The metals tested were mercury, copper, and zinc. This Technical Memorandum reports the results of the sampling and analyses.

Both COS and SKS process tuna and the process wastewater is discharged to the outer Pago Pago Harbor through a pipeline terminating in an engineered diffuser in approximately 176 feet of water. The COS NPDES Permit renewal application[1] indicated that mercury will require a mixing zone based on recent changes in the American Samoa Water Quality Standards (ASWQS). Previous mercury sampling has been conducted for informational purposes. The results of this effluent mercury analysis will be included in the mercury database for establishing a mercury zone of mixing (ZOM).

The existing COS NPDES Permit and renewal application has a permitted ZOM for both copper and zinc. Formerly COS collected and analyzed effluent copper and zinc on a monthly basis and these data were reported on the COS monthly Discharge Monitoring Report (DMR) forms. During the NPDES Permit renewal period the U.S. Environmental Protection Agency (USEPA) has approved semi-annual effluent testing for copper and zinc at the same time as the effluent toxicity testing in place of the monthly sampling. The

[1] Submitted to USEPA in July 2005.

results reported in this Technical Memorandum are intended to satisfy that requirement. This approach to testing the effluent is expected to carry over to the renewal NPDES Permit when it is issued.

Approach and Methods

Sampling and sample handling methods followed the standard operating procedures (SOP) that were previously developed and approved by the USEPA and ASEPA for cannery effluent sampling. Between 09:00 on 7 November 2006 and 06:00 on 9 November 2006, samples of final effluent were collected from the COS effluent discharge. Samples were collected from the established effluent sampling site. Detailed sampling procedures are described in the established SOP for cannery effluent sampling.

A total of eight grab samples were collected into 1-gallon plastic cubitainers. At the same times eight grab samples were collected into laboratory supplied, pre-cleaned, 1 liter plastic bottles at each cannery (for copper and zinc ICP analysis). Samples were collected at approximately three-hour intervals over the 24-hour period. Each cannery started the sampling at the same time to simulate the cannery effluent entering the JCO[2]. The samples were stored on ice or in a refrigerator until the completion of the 24-hour sampling period. After all samples were collected, laboratory supplied bottles (for mercury analysis) were filled at the same time a flow-proportioned composite sample was prepared for the concurrent bioassay test sample. The samples were packed on ice in an ice chest for shipment to the laboratory. A chain-of-custody form for the samples was completed and sealed into a zip-lock bag and taped inside the lid of the ice chest. The samples were shipped via DHL to the testing laboratory. The chain-of-custody form and the DHL waybill are provided in Attachment I.

Results

The grab sample collection times, effluent flow rates, and results of the analyses for metals are summarized in Table 1, 2, and 3, for mercury, copper, and zinc, respectively. The laboratory data report is provided in Attachment 2.

The results of the metals testing for mercury indicate:

- The average mercury concentration for the COS November 2006 samples (0.093 µg/l; Table 1) is less than half the value reported in the priority pollutant scan[3] (0.23 µg/l) and lower than the averages of supplemental mercury testing conducted in previous analyses.
- There was little variability among the results from individual grab samples (standard deviation = 0.019 µg/l) as shown in Table 1.
- All of the samples were above the recently revised ASWQS water quality standard criteria of 0.05 µg/l, and all values are below the USEPA National Recommended Water Quality Criteria (0.94 µg/l). The current NPDES Permit does not have a limitation for mercury.

[2] Results of the SKS metals analyses and the JCO bioassay testing are presented in separate reports
[3] Conducted in September 2004.

- There appears to be no significant relationship between the flow rate and the effluent mercury concentration as shown in Figure 1.

The results of the metals testing for copper indicate:

- The average copper concentration for the COS November 2006 samples was 8.51 µg/l (Table 2).
- There was little variability among the copper results from the eight individual grab samples with the standard deviation (2.33 µg/l) at about 25% of the mean with a range between 6.20 µg/l and 12.4 µg/l (Table 2).
- All eight copper samples were above the ASWQS criteria[4] of 3.1 µg/l. The values are well below the current NPDES Permit limitation for copper (monthly average of 66 µg/l, and daily maximum of 108 µg/l).
- There appears to be no significant relationship between the flow rate and the effluent copper concentrations as shown in Figure 2.

The results of the sample testing for zinc indicate:

- The average zinc concentration for the COS November 2006 samples was 327 µg/l (Table 3).
- There was noticeable but relatively small variability among the zinc results from individual grab samples (standard deviation = 64.5) with a range between 245 µg/l and 433 µg/l (Table 3).
- All eight zinc samples were above the ASWQS criteria[5] of 81 µg/l. All values are well below the current NPDES Permit limitation (1545 µg/l monthly average and 1770 µg/l daily maximum).
- There appears to be no significant relationship between the flow rate and the effluent zinc concentration as shown in Figure 3.

Discussion

Each of the metals under consideration has been previously measured in the effluent above the ASWQS criteria. A ZOM for mercury will be required in the renewal NPDES permit. The existing ZOMs for copper and zinc will need to be retained in the renewal NPDES permit. Table 4 provides the calculations necessary to show that ASWQS will be achieved within the zone of initial dilution.

Mercury: Based on the available data a mixing zone will be required for mercury to comply with the recent revisions to the ASWQS (0.05 µg/l). The highest value recorded from the

[4] The ASWQS criterion for copper is based on the USEPA National Recommended Water Quality Criteria, by reference.
[5] The ASWQS criterion for zinc is based on the USEPA National Recommended Water Quality Criteria, by reference.

COS November 2006 sampling was 0.131 µg/l. The maximum recorded receiving water mercury concentration within Pago Pago Harbor, in the vicinity of the discharge; during the Harbor Water Quality Monitoring studies was 0.0232 µg/l.

The dilution required to reduce the effluent concentration to the ASWQS is 4.0:1 (Table 4). Such a dilution is well within the zone of initial dilution (ZID) and occurs within two meters of the discharge based on previous dilution modeling done for the outfall diffuser.

Copper: A mixing zone for copper already exists in the NPDES Permit. A check of the dilution required for copper to comply with the ASWQS (3.1 µg/l) is calculated below (Table 4). The highest value of copper recorded from the COS November 2006 sampling was 12.4 µg/l. The maximum recorded receiving water copper concentration within Pago Pago Harbor, in the vicinity of the discharge, was 0.83 µg/l.[6]

The dilution required to reduce the effluent concentration to the ASWQS is 5.1:1. This dilution is well within the zone of initial dilution (ZID) and occurs within about two meters of the diffuser based on previous dilution modeling done for the outfall diffuser.

Zinc: A mixing zone already exists for zinc and is documented in the NPDES Permit. The dilution calculations for zinc to comply with the ASWQS (81 µg/l) are provided below (Table 4). The highest value recorded from the COS November 2006 sampling was 433µg/l. The maximum recorded receiving water zinc concentration within Pago Pago Harbor; in the vicinity of the discharge was 5.5 µg/l.[7]

The dilution required to reduce the effluent concentration to the ASWQS is 5.7:1. This dilution is well within the zone of initial dilution (ZID) and occurs within about two meters of the diffuser based on previous dilution modeling done for the outfall diffuser.

[6] This value for copper is the highest receiving water concentration measured, during the NPDES Permit required Pago Pago Harbor Water Quality Monitoring Program, excluding outliers greater than three standard deviations from the mean.

[7] This value for zinc is the highest receiving water concentration measured during the NPDES Permit required Pago Pago Harbor Water Quality Monitoring Program, excluding outliers greater than three standard deviations from the mean.

Table 1
COS Effluent Flows and Mercury Concentrations
7 – 8 November 2006

Grab Sample Number	Sampling Date and Time	Effluent Flow Rate (mgd)	Mercury Concentrations (µg/l)
1	7 November 2006 09:00	0.72	0.0822
2	12:00	0.72	0.131
3	15:00	0.74	0.0917
4	18:00	0.74	0.0797
5	21:00	0.74	0.109
6	24:00	0.80	0.0786
7	8 November 2006 03:00	0.80	0.0761
8	06:00	0.80	0.0974
Minimum		0.72	0.076
Average		0.75	0.093
Maximum		0.80	0.131
Standard Deviation		0.036	0.0189

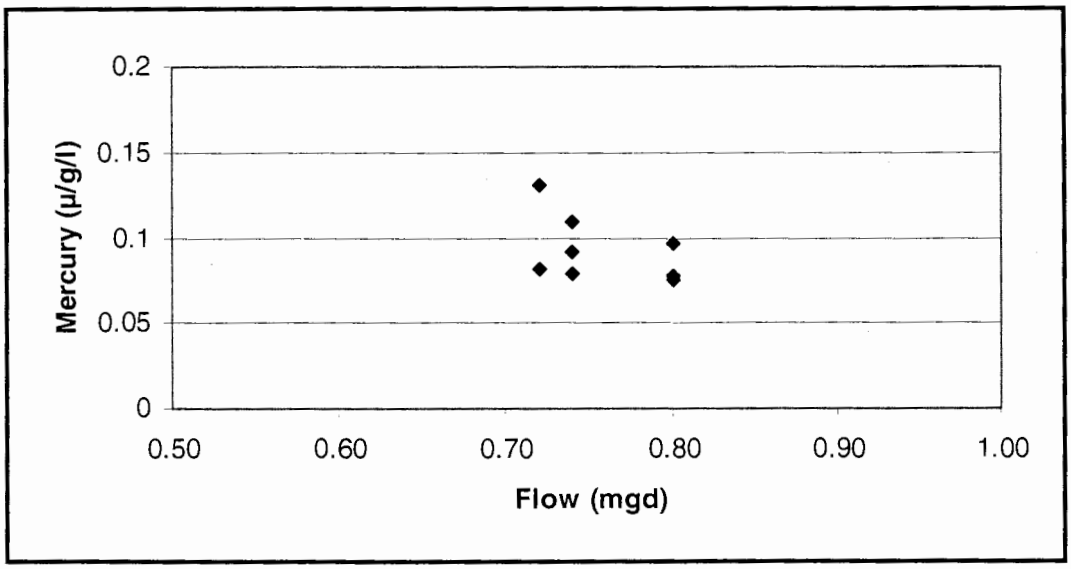


Figure 1.
Scatter plot of COS effluent flow rate and mercury concentration (Nov 2006)

Table 2 COS Effluent Flows and Copper Concentrations 7 – 8 November 2006			
Grab Sample Number	**Sampling Date and Time**	**Effluent Flow Rate (mgd)**	**Copper Concentrations (µg/l)**
1	7 November 2006 09:00	0.72	7.66
2	12:00	0.72	12.4
3	15:00	0.74	8.29
4	18:00	0.74	6.20
5	21:00	0.74	6.94
6	24:00	0.80	7.30
7	8 November 2006 03:00	0.80	11.9
8	06:00	0.80	7.39
Minimum		0.72	6.20
Average		0.75	8.51
Maximum		0.80	12.4
Standard Deviation		0.036	2.33

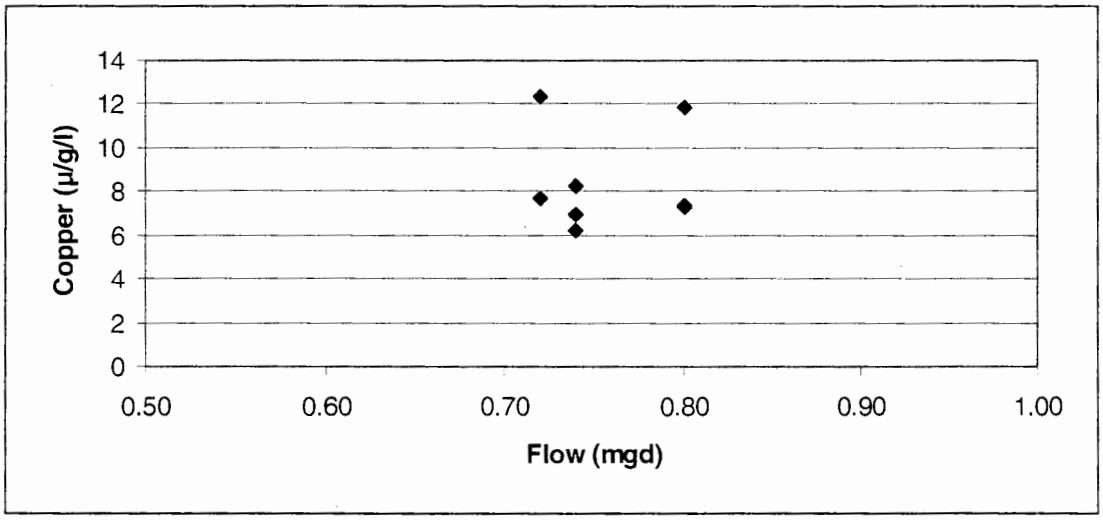


Figure 2.
Scatter plot of COS effluent flow rate and copper concentration (Nov 2006)

Table 3 COS Effluent Flows and Zinc Concentrations 7 – 8 November 2006			
Grab Sample Number	**Sampling Date and Time**	**Effluent Flow Rate (mgd)**	**Zinc Concentrations (µg/l)**
1	7 November 2006 09:00	0.72	368
2	12:00	0.72	433
3	15:00	0.74	371
4	18:00	0.74	266
5	21:00	0.74	322
6	24:00	0.80	342
7	8 November 2006 03:00	0.80	245
8	06:00	0.80	267
Minimum		0.72	245
Average		0.75	327
Maximum		0.80	433
Standard Deviation		0.036	64.5

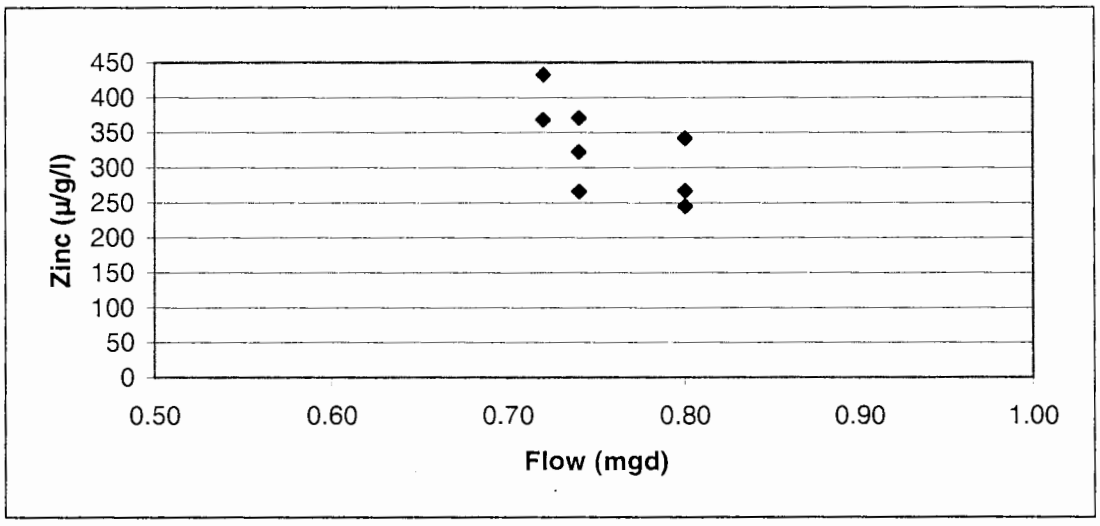


Figure 3.
Scatter plot of COS effluent flow rate and zinc concentration (Nov 2006)

Table 4.
Calculations of Required Dilution

Calculation of Required Dilution for Mercury

D_R = dilution required to meet ASWQS
C_E = effluent concentration
C_A = receiving water ambient concentration = 0.0232 µg/l
C_S = ASWQS = 0.05 µg/l

For C_E = 0.131 µg/l:

$$D_R = \frac{C_E - C_A}{C_S - C_A} = \frac{0.131 - 0.0232}{0.05 - 0.0232} = 4.02$$

Calculation of Required Dilution for Copper

D_R = dilution required to meet ASWQS
C_E = effluent concentration
C_A = receiving water ambient concentration = 0.83 µg/l
C_S = ASWQS = 3.1 µg/l

For C_E = 12.4 µg/l:

$$D_R = \frac{C_E - C_A}{C_S - C_A} = \frac{12.4 - 0.83}{3.1 - 0.83} = 5.10$$

Calculation of Required Dilution for Zinc

D_R = dilution required to meet ASWQS
C_E = effluent concentration
C_A = receiving water ambient concentration = 5.5 µg/l
C_S = ASWQS = 81 µg/l

For C_E = 433 µg/l:

$$D_R = \frac{C_E - C_A}{C_S - C_A} = \frac{433 - 5.5}{81 - 5.5} = 5.66$$

ATTACHMENT I

Chain-of-Custody

Columbia Analytical Services INC.
An Employee - Owned Company

CHAIN OF CUSTODY

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222x07 • FAX (360) 636-1068

SR#: K0610035

PAGE 1 OF 1 COC #

PROJECT NAME: SAMOA PACKING EFFLUENT MONITORING
PROJECT NUMBER: 147323.IC.06.TW
PROJECT MANAGER: STEVE COSTA - CH2M HILL
COMPANY/ADDRESS: P.O. Box 1238
TRINIDAD, CA 95570
CITY/STATE/ZIP:
E-MAIL ADDRESS: SCOSTA@CH2M.COM
PHONE #: 707-677-0123 FAX #: 707-677-0123
SAMPLER'S SIGNATURE:

SAMPLE I.D.	DATE	TIME	LAB I.D.	MATRIX	NUMBER OF CONTAINERS	PAHS 8310 ☐ SIM ☐	Metals (Total or Dissolved) (See list below)	REMARKS
COS-1	7 Nov 2006		1	H_2O	2	X		
COS-2			2		2	X		
COS-3			3		2	X		
COS-4			4		2	X		
COS-5			5		2	X		
COS-6			6		2	X		
COS-7			7		2	X		
COS-8			8		2	X		

Semivolatile Organics by GC/MS 625 ☐ 8270 ☐ 8270LL ☐
Volatile Organics 624 ☐ 8260 ☐ 8021 ☐ BTEX ☐
Hydrocarbons (*see below) Gas ☐ Diesel ☐ Oil ☐
☐ Fuel Fingerprint (FIQ) ☐ NW-HCID Screen
Oil & Grease/TRPH 1664 SGT ☐ 1664 HEM ☐
PCB's Aroclors ☐ Congeners ☐
Pesticides/Herbicides 608 ☐ 8081A ☐ 8141A ☐ 8151A ☐
Chlorophenolics - 8151M Tri ☐ Tetra ☐ PCP ☐
Cyanide ☐ Hex-Chrom ☐
pH, Cond., Cl, SO_4, PO_4, F, NO_2, NO_3, BOD, TSS, TDS (circle)
NH_3-N, COD, Total-P, TKN, TOC, DOC (circle) NO_2+NO_3
TOX 9020 ☐ AOX 1650 ☐ 506 ☐

REPORT REQUIREMENTS

___ I. Routine Report: Method Blank, Surrogate, as required
X II. Report Dup., MS, MSD as required
___ III. Data Validation Report (includes all raw data)
___ IV. CLP Deliverable Report
___ V. EDD

INVOICE INFORMATION

P.O. #
Bill To:

TURNAROUND REQUIREMENTS

___ 24 hr. ___ 48 hr.
___ 5 Day
___ Standard (10-15 working days)
___ Provide FAX Results
Requested Report Date

Circle which metals are to be analyzed:

Total Metals: Al As Sb Ba Be B Ca Cd Co Cr (Cu) Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V (Zn) (Hg)

Dissolved Metals: Al As Sb Ba Be B Ca Cd Co Cr Cu Fe Pb Mg Mn Mo Ni K Ag Na Se Sr Tl Sn V Zn Hg

*INDICATE STATE HYDROCARBON PROCEDURE: AK CA WI NORTHWEST OTHER:_____ (CIRCLE ONE)

SPECIAL INSTRUCTIONS/COMMENTS:

SHIP VIA DHL - AIRBILL # 782 0788 426

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature:	Signature:	Signature	Signature
Date/Time: 9 Nov 2006	Date/Time: 11/15/06 1100	Date/Time	Date/Time
Printed Name: COSTA	Printed Name: JWell	Printed Name	Printed Name
Firm: CH2M HILL	Firm: CAS	Firm	Firm

RCOC #1 06/03

ATTACHMENT II

Columbia Analytical Systems Laboratory Report

COLUMBIA ANALYTICAL SERVICES, INC.

Client:	CH2M Hill	**Service Request No.:**	K0610035
Project:	Samoa Packing Effluent Monitoring/147323.JC.06.TW		
Date Received:	11/15/06	**Sample Matrix:**	Water

CASE NARRATIVE

All analyses were performed consistent with the quality assurance program of Columbia Analytical Services, Inc. (CAS). This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Laboratory Control Sample (LCS).

Sample Receipt

Eight water samples were received for analysis at Columbia Analytical Services on 11/15/06. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4°C/frozen at –20°C upon receipt at the laboratory.

Total Metals

No anomalies associated with the analysis of these samples were observed.

Approved by_____ Date 12/19/06

Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
B	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL has been elevated due to a matrix interference.
X	See case narrative.
*	The duplicate analysis not within control limits. See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated concentration that is less than the MRL but greater than or equal to the MDL.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results (25% for CLP Pesticides).
U	The compound was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL.
i	The MRL/MDL has been elevated due to a chromatographic interference.
X	See case narrative.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	CH2M Hill	**Service Request:**	K0610035
Project:	Samoa Packing Effluent Monitoring/147323.JC.06.TW	**Date Collected:**	11/7/06
Sample Matrix:	Water	**Date Received:**	11/15/06

Mercury, Total

Prep Method:	METHOD	Units:	ng/L
Analysis Method:	1631E	Basis:	NA
Test Notes:			

Sample Name	Lab Code	MRL	MDL	Dilution Factor	Date Extracted	Date Analyzed	Result	Result Notes
COS-1	K0610035-001	5.0	0.35	5	11/15/06	12/11/06	82.2	
COS-2	K0610035-002	5.0	0.35	5	11/15/06	12/11/06	131	
COS-3	K0610035-003	5.0	0.35	5	11/15/06	12/11/06	91.7	
COS-4	K0610035-004	5.0	0.35	5	11/15/06	12/11/06	79.7	
COS-5	K0610035-005	5.0	0.35	5	11/15/06	12/11/06	109	
COS-6	K0610035-006	5.0	0.35	5	11/15/06	12/11/06	78.6	
COS-7	K0610035-007	5.0	0.35	5	11/15/06	12/11/06	76.1	
COS-8	K0610035-008	5.0	0.35	5	11/15/06	12/11/06	97.4	
Method Blank 1	K0610035-MB1	1.0	0.07	1	11/30/06	12/11/06	ND	
Method Blank 2	K0610035-MB2	1.0	0.07	1	11/15/06	12/11/06	ND	
Method Blank 3	K0610035-MB3	1.0	0.07	1	11/15/06	12/11/06	ND	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K0610035
Project:	Samoa Packing Effluent Monitoring/147323.JC.06.TW	**Date Collected:**	11/7/06
Sample Matrix:	Water	**Date Received:**	11/15/06
		Date Extracted:	11/15/06
		Date Analyzed:	12/11/06

Matrix Spike/Duplicate Matrix Spike Summary
Total Metals

Sample Name:	COS-1	Units:	ng/L
Lab Code:	K0610035-001S, K0610035-001SD	Basis:	NA
Test Notes:			

Analyte	Prep Method	Analysis Method	MRL	Spike Level MS	Spike Level DMS	Sample Result	Spike Result MS	Spike Result DMS	Percent Recovery MS	Percent Recovery DMS	CAS Acceptance Limits	Relative Percent Difference	Result Notes
Mercury	METHOD	1631E	5.0	250	250	82.2	276	287	78	82	71-125	4	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K0610035
Project:	Samoa Packing Effluent Monitoring/147323.JC.06.TW	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	11/15/06
		Date Analyzed:	12/11/06

Ongoing Precision and Recovery (OPR) Sample Summary

Total Metals

Sample Name: Ongoing Precision and Recovery (Initial)

Units: ng/L

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	4.16	83	77-123	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K0610035
Project:	Samoa Packing Effluent Monitoring/147323.JC.06.TW	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	11/15/06
		Date Analyzed:	12/11/06

Ongoing Precision and Recovery (OPR) Sample Summary

Total Metals

Sample Name: Ongoing Precision and Recovery (Final) Units: ng/L

Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	4.24	85	77-123	

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	CH2M Hill	**Service Request:**	K0610035
Project:	Samoa Packing Effluent Monitoring/147323.JC.06.TW	**Date Collected:**	NA
LCS Matrix:	Water	**Date Received:**	NA
		Date Extracted:	11/15/06
		Date Analyzed:	12/11/06

Quality Control Sample (QCS) Summary
Total Metals

Sample Name: Quality Control Sample

Units: ng/L
Basis: NA

Test Notes:

Analyte	Prep Method	Analysis Method	True Value	Result	Percent Recovery	CAS Percent Recovery Acceptance Limits	Result Notes
Mercury	METHOD	1631E	5.00	4.22	84	77-123	

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-1 Lab Code: K0610035-001

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	7.66		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	368		

% Solids: 0.0

Comments:

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-2 Lab Code: K0610035-002

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	12.4		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	433		

% Solids: 0.0

Comments:

00040

Columbia Analytical Services

METALS
-1-
INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-3 Lab Code: K0610035-003

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	8.29		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	371		

% Solids: 0.0

Comments:

00041

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-4 Lab Code: K0610035-004

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	6.20		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	266		

% Solids: 0.0

Comments:

00042

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-5 Lab Code: K0610035-005

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	6.94		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	322		

% Solids: 0.0

Comments:

00043

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-6 Lab Code: K0610035-006

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	7.30		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	342		

% Solids: 0.0

Comments:

00044

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-7 Lab Code: K0610035-007

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	11.9		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	245		

% Solids: 0.0

Comments:

00045

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	11/07/06
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	11/15/06
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: COS-8 Lab Code: K0610035-008

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	7.39		
Zinc	200.8	20.00	0.80	20	11/21/06	11/22/06	267		

% Solids: 0.0

Comments:

00046

Columbia Analytical Services

METALS

-1-

INORGANIC ANALYSIS DATA SHEET

Client:	CH2M Hill	Service Request:	K0610035
Project No.:	147323.JC.06.TW	Date Collected:	
Project Name:	Samoa Packing Effluent Monitoring	Date Received:	
Matrix:	WATER	Units:	µG/L
		Basis:	NA

Sample Name: Method Blank Lab Code: K0610035-MB

Analyte	Analysis Method	MRL	MDL	Dil.	Date Extracted	Date Analyzed	Result	C	Q
Copper	200.8	0.20	0.01	1	11/21/06	11/22/06	0.01	B	
Zinc	200.8	1.00	0.04	1	11/21/06	11/22/06	0.06	B	

% Solids: 0.0

Comments:

00047

Columbia Analytical Services

METALS
- 2a -
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: CH2M Hill Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

ICV Source: Inorganic Ventures CCV Source: Various

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Copper	12.5	12.4	99	25.0	25.2	101	24.5	98	200.8
Zinc	25.0	24.7	99	25.0	25.1	100	24.9	100	200.8

METALS
- 2a -
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

ICV Source:

CCV Source: Various

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Copper				25.0	25.0	100	25.3	101	200.8
Zinc				25.0	24.9	100	25.1	100	200.8

00049

Columbia Analytical Services

METALS
- 2a -
INITIAL AND CONTINUING CALIBRATION VERIFICATION

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

ICV Source:

CCV Source: Various

Concentration Units: ug/L

Analyte	Initial Calibration			Continuing Calibration					Method
	True	Found	%R(1)	True	Found	%R(1)	Found	%R(1)	
Copper				25.0	25.7	103			200.8
Zinc				25.0	25.5	102			200.8

00050

METALS
- 2b -
CRDL STANDARD FOR AA AND ICP

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
				Initial			Final	
	True	Found	%R	True	Found	%R	Found	%R
Copper				1.0	1.03	103		
Zinc				5.0	5.17	103		

METALS
- 3 -
BLANKS

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C		Preparation Blank	C		Method
Copper	0.05	U	0.05	U	0.05	U	0.05	U					200.8
Zinc	0.20	U	0.20	U	0.20	U	0.20	U					200.8

00052

Columbia Analytical Services

METALS
- 3 -
BLANKS

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

Preparation Blank Matrix (soil/water): WATER

Preparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L) 1	C	2	C	3	C	Preparation Blank	C	Method
Copper			0.05	U	0.05	U					200.8
Zinc			0.20	U	0.20	U					200.8

00053

Columbia Analytical Services

METALS

- 7 -

LABORATORY CONTROL SAMPLE

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monitoring

Aqueous LCS Source: Inorganic Ventures

Solid LCS Source:

Analyte	Aqueous ug/L True	Found	%R	Solid (mg/kg) True	Found	C	Limits		%R
Copper	2.00	1.89	95						
Zinc	2.00	1.97	99						

00054

Columbia Analytical Services

METALS

- 7 -

LABORATORY CONTROL SAMPLE

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monitoring

Aqueous LCS Source: Inorganic Ventures

Solid LCS Source:

Analyte	Aqueous ug/L			Solid (mg/kg)				
	True	Found	%R	True	Found	C	Limits	%R
Copper	2.00	1.87	94					
Zinc	2.00	1.95	98					

00055

Columbia Analytical Services

METALS

-10-

METHOD DETECTION LIMITS

Client: CH2M Hill

Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

ICP/ICP-MS ID #: X Series

GFAA ID #:

AA ID #:

Analyte	Mass	Back-ground	MRL (ug/L)	MDL (ug/L)	Method
Copper	65		1.00	0.05	200.8
Zinc	66		5.00	0.20	200.8

Comments:

00056

METALS

-12-

ICP LINEAR RANGES (QUARTERLY)

Client: CH2M Hill Service Request: K0610035

Project No.: 147323.JC.06.TW

Project Name: Samoa Packing Effluent Monit

ICP ID Number: X Series

Analyte	Integ. Time (Sec.)	Concentration (ug/L)	Method
Copper	15.00	400.0	200.8
Zinc	15.00	1000.0	200.8

Comments: _____

Copy to Cda
Stuart/Melgan

Engineers
Planners
Economists
Scientists

29 April 1993

PDX30702.SM

Patricia N.N. Young
American Samoa Program Manager
Office of Pacific Islands and Native American Programs
U.S. Environmental Protection Agency
75 Hawthorne Street (E-4)
San Francisco, California 94105

Dear Pat:

Subject: Joint Cannery Outfall Sediment Monitoring Study

Enclosed are two copies of a Technical Memorandum describing the results of the Sediment Monitoring Study done under StarKist Samoa and VCS Samoa Packing NPDES permit requirements. We will be forwarding our study plan for the second sampling event for your review by the end of May 1993. We foresee no significant modifications.

If have any questions please feel free to call me at your convenience.

Sincerely,

CH2M HILL

Steven L. Costa
Project Manager

cc: Norman Wei/StarKist Seafood Company
James Cox/Van Camp Seafood Company
Maurice Callaghan, StarKist Samoa, Inc.
Michael Macready, VCS Samoa Packing Co.

CH2M HILL 1111 Broadway, Suite 1200, Oakland, CA 94607-4046 510 251-2426
P.O. Box 12681, Oakland, CA 94604-2681 Fax No. 510 893-8205

PREPARED FOR: StarKist Samoa, Inc
VCS Samoa Packing Company

PREPARED BY: David Wilson/CH2M HILL/SEA
Steve Costa/CH2M HILL/SFO

DATE: 29 April 1993

SUBJECT: **Sediment Monitoring Study**
February 1993 Data Collection

PROJECT: PDX30702.SM.R1

Introduction

This memorandum presents the field collection and laboratory analysis of marine sediments collected in the inner and outer regions of Pago Pago Harbor. This is the first sediment monitoring episode and provides a baseline for comparison with future measurements. This work has been conducted to comply with Section G of the StarKist Samoa and Samoa Packing NPDES permits, which state the following:

> "Sediment monitoring is conducted to determine the character of the sediments in relation to long-term high nutrient discharge by the permittee in the harbor and if harbor recovery will be affected by resuspension of the nutrients.
>
> The permittee, cooperatively with (Samoa Packing Co.; StarKist, Inc) shall undertake a yearly sediment monitoring program in Pago Pago Harbor in order to assess the concentration of nutrient and organic components, the distribution of stored nutrients, the size of the nutrient reservoir, and the rate of accumulation of nutrients. Seven sites shall be located within Pago Pago Harbor and analyzed for total nitrogen, total phosphorus, percent organics, percent solids, bulk density, oxidation-reduction potential, and sulfides. Three sites shall be located in inner Pago Pago Harbor and four sites shall be located in the outer harbor. These sites and monitoring plan shall be submitted within three months of the effective date of the permit for approval by ASEPA and EPA. Thereafter, these sites shall be approved annually by the anniversary date of the effective date of the permit. A report of the sediment monitoring program findings shall be submitted to the ASEPA and EPA 90 days after completion of sampling.
>
> After the first two studies have been performed and the results have been assessed, the permit may be reopened for the inclusion of a more frequent or less frequent monitoring schedule."

A Sediment Monitoring Study Plan was submitted for review and approval to the EPA and ASEPA on January 6, 1993. During the development and review of the Sediment Monitoring Study Plan, specific changes or clarification of the sediment analyses were agreed to with the EPA and ASEPA. Particle size analysis replaced bulk density, and the percent organics in sediments is to be provided by total volatile solids analysis. In addition, the location of one sediment sampling site (IH-3) was changed, at the request of ASEPA, and the revised location was near the mouth of Pago Pago Stream. The changes have all been incorporated into the final study plan for the initial sediment sampling and analysis.

Objectives and Approach

The objectives of the Sediment Monitoring are: (1) to evaluate the characteristics and nutrient load of the marine sediments in the vicinity of the canneries historic (abandoned) outfalls in the inner harbor; (2) to evaluate the characteristics and nutrient load of the marine sediments in the vicinity of the new joint cannery outfall diffuser into the outer harbor; and (3) to provide data for an evaluation of changes in harbor sediments over time. The sediment data presented in this document are the first data set for the Sediment Monitoring Study, and subsequent sample collections and analyses will provide data for the assessment of changes over time, as well as changes between sites within Pago Pago Harbor.

Sampling sites were located based on the predominant current directions at the outfall areas, bathymetry of the area, limited information on sediment physical characteristics, and the location of other point sources. Sediment samples were collected at the following seven sites (Figure 1) in February 1993, in accordance with the approved study plan:

- Inner harbor site IH-1: located within 100 feet of, and between, the two previous cannery outfalls in the inner harbor
- Inner harbor site IH-2: located within 500 feet directly south of, and between, the two previous cannery outfalls in the inner harbor
- Inner harbor site IH-3: located within 250 feet of the mouth of Pago Pago Stream, at the west end of the inner harbor
- Outer harbor site OH-1: located within 400 feet north-northeast of the new outfall diffuser in the outer harbor;

- Outer harbor site OH-2: located within 400 feet south-southwest of the new outfall diffuser
- Outer harbor site OH-3: located directly across the outer harbor from the new outfall diffuser and about 20 feet of the Utulei WWTP outfall
- Outer harbor site OH-4: located in the center of the outer harbor area mid-way between Tulutulu Point and Tafagamanu Point, and north of Whale Rock.

The sampling sites were located using a MiniRanger. This provides a high degree of repeatability for stationing for future sampling episodes. The MiniRanger coordinates for each Station are given in Table 1.

Methods

Sediment sampling was conducted in accordance with the approved Sediment Monitoring Study Plan, and consistent with the Procedures for Handling and Chemical Analysis of Sediment and Water Samples (U.S. EPA and Army COE, 1981).

Sediment samples were collected using a 0.0225 meter^2 petite Ponar grab sampler. The Ponar sampler is a weighted sediment grab sampler designed to penetrate and collect undisturbed samples of sediments ranging from silts to coarse gravels. Samples were collected in five separate grabs at each of the seven sites, except at OH-3. At OH-3, three grab samples were collected by a diver from the seabed within 20 feet of the Utulei outfall discharge port. Sufficient sediment materials were collected for the sediment chemistry tests and to provide archive materials.

Prior to disturbing the sample, the following were recorded in the field logbook; date, time, water depth, sediment sample penetration depth, color, texture/type, odor, depth of visible oxidation-reduction layer, and photograph and film roll number. Photographs were taken of each sediment sample. The Orion Redox Potential and pH meter was damaged during shipment, and oxidation-reduction potential measurements could not be taken. However, visual observations of the depth to anoxic sediments were made which partially compensate for the lack of direct measurements.

The surface 2 cm depth layer of each grab sample was composited into a stainless steel bowl and small (<1-oz.) sample portion of each grab was place directly into a 4-ounce jar for the sulfide analysis. The composite sample was stirred, and an 8-ounce and 16-ounce container were filled from the composite sediment sample using a pre-cleaned

stainless steel spoon. The surface sediments collected by hand by a diver at OH-3 were composited for all tests. Samples collected at each site were labeled with a unique label. All sediment sample containers were sealed into ziplock bags and stored on ice in an ice chest for transport to the laboratory. A total of seven composite sediment samples were submitted for chemical and physical analyses.

Sediment sampling was completed at IH-1, IH-2, IH-3, OH-3, and OH-4 on February 13, 1993. Sediment samples were collected at OH-1 and OH-2 on February 18, 1993, after the outfall diffuser in the outer harbor was located and marked with a buoy. All sediment samples were stored on ice until delivered to the laboratory. Sample chain of custody forms were completed and then sealed into zip-lock bags and taped inside the lid of the ice chest. Samples were shipped as checked luggage on flights from Pago to Honolulu and then to Seattle. Samples were delivered to North Creek Analytical Laboratory before 1200 on February 23rd.

Sediment samples were analyzed for the chemical and physical parameters listed in Table 2. The sample containers, sample handling requirements and sample preservation requirements were in accordance with those listed in Table 2, with the exception that sulfide samples exceeded the recommended holding time. This holding time exceedance is not considered significant, since the sulfide samples were preserved with zinc acetate and held on ice. The sediment sampling and shipping dates were extended in the field, because of unavoidable delays in obtaining field equipment in American Samoa.

Results

Complete laboratory data sets, laboratory quality control data reports, and chain-of-custody forms are attached to this memorandum. The chain-of-custody form is included in Attachment 1 and analytical data sheets and quality control data reports are included as Attachment 2. The physical characteristics and descriptions of the marine sediments collected in Pago Pago Harbor are provided in Table 3, and the results of the chemical analyses are provided in Table 4.

Physical Analysis. The physical characteristics of the sediments near the old cannery outfalls (IH-1) are very similar to those near the mouth of Pago Pago Stream (IH-3) in the inner harbor (Table 3). Sediments at both IH-1 and IH-3 consisted of grey-black sandy-silts with visible oil sheen, a strong sulfurous odor, and essentially no surface oxidized sediment layer. Both of these inner harbor sites had sediments with low densities (26 and 30 percent solids), indicating organic material depositions at these sites. Sediments collected from 500 feet south of the old cannery outfalls (IH-2)

consisted primarily of silts with a thin (1-2 cm) oxidized surface layer, a slight sulfurous odor, and 45 percent solids content.

Sediments collected from the outer harbor all consisted of oxidized sediments with varying mixes of silts and sands. These outer harbor sediments also had a much greater density (e.g. 58 to 69 percent solids). Sediment sampling sites OH-1 and -2 were located near the new canneries outfall and proximate to the coral reef slope on the east side of harbor. OH-3 was located near the Utulei sewage outfall and within 200 feet of the coral reef on the west side of the harbor. OH-4 was located in the middle of the outer harbor. Sediments collected near the joint cannery outfall (at OH-1 and -2) were predominantly tan silts with less than 20 percent sands and they were oxidized throughout the entire sample depth (6 cm). Sediments from the middle of the outer harbor (OH-4) were 56% coral sands and medium sands and 43% silts, and they were oxidized throughout the entire sample depth (6 cm). Sediments collected at the Utulei outfall (OH-3) were much coarser than the middle and eastern regions of the outer harbor, with 90% coral sands and less than 10 percent silts.

Chemical Analysis. Sediment chemical analyses results for the inner and outer harbor sites are summarized in Table 4. The sediment physical data indicates substantial differences between the inner and outer harbor areas, and these difference correlate with the sediment organic content. Sediment organics, as measured by total volatile solids, ranged from 9.3 to 19 percent in the inner harbor sites compared with 3.1 to 5.6 percent in the outer harbor sites. Sediments collected at IH-1 and IH-3 show substantially elevated values of total volatile solids (TVS), total Kjeldahl nitrogen (TKN), total phosphorus (TP), and total sulfide compared to other sites. In comparison, IH-2, located only 500 feet from the previous cannery outfalls and near the center of the inner harbor basin, had TVS, TKN, and total sulfide concentrations that were 50 percent less than at IH-1 and 30 percent less than at IH-3. An oxidized surface sediment layer was also observed at IH-2, indicating that the anoxic sediments may be localized near stream mouths and previous outfalls.

The outer harbor sediments show very little difference in organic contents between the four sites (Table 4), despite the differences in sediment physical characteristics (Table 3). The sediments at OH-1 and -2, located near the new outfall diffuser, consisted primarily of silts and these sites had total volatile solids values of 5.6 and 4.9 percent, respectively. By comparison, the sediments at OH-3 and -4 consisted mainly of sands and these sites had TVS values of 3.1 and 4.2 percent, respectively. TKN and TP values were equivalent at all sites in the outer harbor. Total sulfides concentrations were slightly above the reporting limit for samples from the two near outfall sites, and were not detected at the other two sites. Sediments from these four outer harbor

sampling sites were observed to be completely oxidized throughout the sample depth, with no oxidation-reduction layer.

Summary

The sediments near the old cannery outfalls (IH-1) have similar physical and chemical characteristics to those near the mouth of Pago Pago Stream (IH-3) in the inner harbor. Sediments at IH-1 and IH-3 consist of anoxic, grey-black sandy-silts with oil sheen, a strong sulfurous odor, and elevated levels of volatile organics, nitrogen compounds, phosphorus compounds, and sulfides. Both of these inner harbor sites have sediments that appear to consist of deposited organic materials. The sources of the organic deposits and contaminants at both sites include all activities in the inner harbor and its watershed. Sediments from IH-2, only 500 feet south of the old cannery outfalls were grey-brown silts with an oxidized surface layer. IH-2 samples had 30- to 50-percent lower volatile organics, nitrogen compounds, and sulfides, and 10- to 25-percent lower phosphorus compounds, than the sediment samples at IH-1 and IH-3. The transition into oxidized sediments at IH-2, indicates that the organic sediments appear to occur in a localized area.

Although the outer harbor sediments range from predominantly silts near the new outfall (OH-1 and -2) to mainly sands at the middle and west side sampling sites (OH-3 and -4) in the outer harbor, the data show very little difference in organic contents between the four sites. Sediments from these four outer harbor sampling sites were completely oxidized throughout the sample, and sediment nitrogen and phosphorus levels were equivalent at all sites in the outer harbor.

Table 1
Sampling Locations for Sediments in Pago Pago Harbor

Station	Sampling Location and Depth (feet)	Navigation Coordinates for MiniRanger III System (a,b)	
		Code 1	Code 4
IH-1	Between old cannery outfalls in inner harbor (60 feet)	1420 (N)	581 (N)
IH-2	500 feet South of and between old cannery outfalls in inner harbor (100 ft)	1459 (N)	731 (N)
IH-3	250 feet off mouth of Pago Pago Stream in inner harbor (25 ft)	2992 (N)	1679 (N)
OH-1	400 feet NNE of cannery outfall in outer harbor (160 ft)	1264 (S)	1504 (S)
OH-2	400 feet SSW of cannery outfall in outer harbor (180 ft)	1561 (S)	1725 (S)
OH-3	Within 20 feet of the Utulei outfall discharge (120 ft)	1596 (S)	1265 (S)
OH-4	Outer harbor between Tulutulu and Tafagamanu Pts (180 ft)	2048 (S)	1768 (S)

NOTES:

(a) The shore-based Mini-Ranger transponders were located at survey control points as follows: Code 1 - located at Pago Pago Harbor Front Range Tower (261,551.58E and 309,857.04N, State Coordinates (feet)); Code 4 - located at Fagatogo Tram Park Building (258,117.06E and 305,879.24N, State Coordinates (feet)).

(b) The navigation readings are designated as either north (N) or south (S) of the alignment between the Code 1 and Code 4 shore transponder stations.

(c) Coordinates were acquired at the time of sampling at Stations OH-1 and OH-2. At other stations coordinates were determined by revisiting the sites two days later. This procedure was followed because of delays in receiving equipment.

Table 2
Sediment Sample Analyses and Handling Procedures

Parameter	Analytical Methods (a,b,c)	Reporting Detection Limits	Sample Holding Time	Sample Container	Sample Preservation
Total Kjeldahl Nitrogen	EPA 351.3	1 mg/kg	14 days	8-oz. glass	4 deg. C
Total Phosphorus	EPA 6010	10 mg/kg	14 days	8-oz. glass	4 deg. C
Total Sulfides	EPA/COE 1981	0.12 mg/kg	7 days	4-oz. glass	4 deg. C, add 2 ml. Zn-acetate
Total Volatile Solids	EPA 160.4	0.5%	14 days	8-oz. glass	4 deg. C
Percent Solids	EPA/COE 1981; SM2540/B	N/A	14 days	8-oz. glass	None
Particle Size Analysis	ASTM D422	N/A	6 months	8-oz. glass	None

(a) EPA methods are defined in 40 CFR 136.3, Guidelines Establishing Test Procedures for the Analysis of Pollutants.
(b) U.S. EPA and Army Corps of Engineers. May 1981. Procedures for Handling and Chemical Analysis of Sediment and Water Samples.
(c) American Society for Testing Materials. 1974. Part 19:D422; Standard Method for Particle Size Analysis of Soils.

Table 3
Physical Characteristics of Pago Pago Harbor Sediments

Station	Location and Depth (feet)	Sediment Type	Redox Depth (cm)	Particle Size Distribution (Percent)			Percent Solids
				Sand	Silt	Clay	
INNER HARBOR STATIONS							
IH-1	Between old cannery outfalls in inner harbor (60 feet)	Grey-black sandy silts with visible oil sheen and strong sulfurous odor	<0.5	30	70	0	26
IH-2	500 feet South of and between old cannery outfalls in inner harbor (100 ft)	Grey-brown silts with clay, and with slight odor	1-2	8	86	6	45
IH-3	250 feet off mouth of Pago Pago Stream in inner harbor (25 ft)	Grey-black sandy silts with visible oil sheen and strong sulfurous odor	<0.5	33	67	0	30
OUTER HARBOR STATIONS							
OH-1	400 feet NNE of cannery outfall in outer harbor (160 ft)	Tan, sandy silts with clay and no odor	None	11	83	6	60
OH-2	400 feet SSW of cannery outfall in outer harbor (180 ft)	Tan, sandy silts with some clay and no odor	None	19	79	2	59
OH-3	Within 20 feet of the Utulei outfall discharge (120 ft)	Grey-white coral sands and dark gray medium sands, with no odor	None	90	9	1	58
OH-4	Outer harbor between Tulutulu Pt and Tafagamanu Pt (180 ft)	Tan, mixed coral and medium sands and silts, with no odor	None	56	43	1	69

Table 4
Results of Pago Pago Harbor Sediment Chemical Analyses

Site	Sampling Location (Depth in feet)	Percent Solids	Total Volatile Solids (percent)	Total Kjeldahl Nitrogen (mg/kg, dry)	Total Phosphorus (mg/kg, dry)	Total Sulfide (mg/kg, dry)
INNER HARBOR STATIONS						
IH-1	Between old cannery outfalls in inner harbor (60 feet)	26	19	1,700	1,200	41
IH-2	500 ft S & between old cannery outfalls in inner harbor (100 ft)	45	9.3	770	1,100	22
IH-3	250 feet off mouth of Pago Pago Stream in inner harbor (25 ft)	30	14	1,100	1,500	34
OUTER HARBOR STATIONS						
OH-1	400 feet NNE of cannery outfall in outer harbor (160 ft)	60	5.6	480	600	0.8
OH-2	400 feet SSW of cannery outfall in outer harbor (180 ft)	59	4.9	470	570	0.5
OH-3	Within 20 feet of the Utulei outfall discharge (120 ft)	58	3.1	410	530	<0.1
OH-4	Mid-outer harbor between Tulutulu Pt and Tafagamanu Pt (180 ft)	69	4.2	470	470	<0.1

Sediment Monitoring Study
February 1993 Data Collection
StarKist Samoa/VCS Samoa Packing

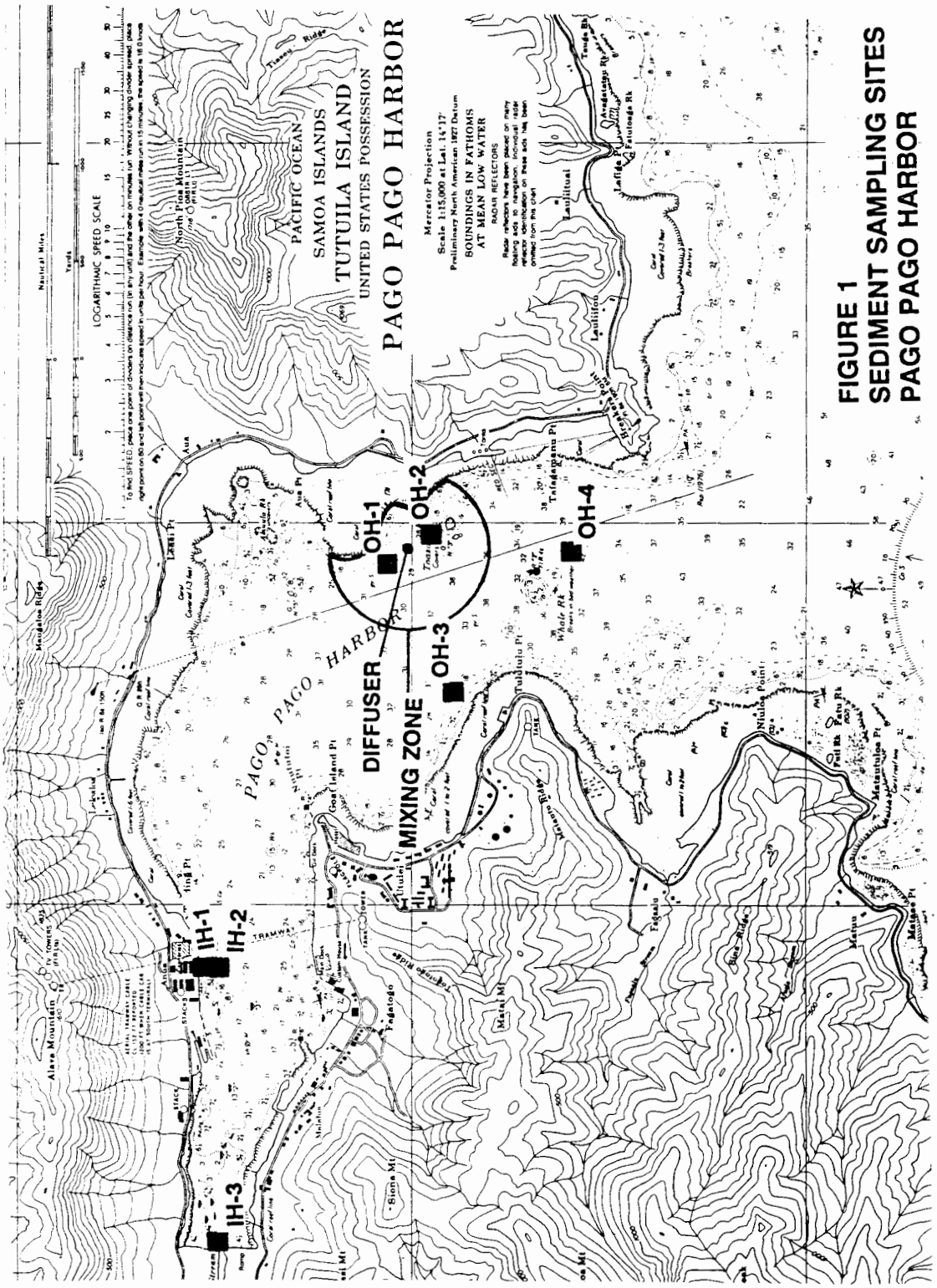


FIGURE 1
SEDIMENT SAMPLING SITES
PAGO PAGO HARBOR

ATTACHMENT I

CHAIN OF CUSTODY FORMS

Marine Sediment Samples from Pago Pago Harbor, American Samoa
February 1993

STARKIST SAMOA, Inc. and VCS SAMOA PACKING COMPANY

CH2M HILL

QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M HILL Project # | Purchase Order #

Project Name: Stockton Samoa NPDES

Company Name/CH2M HILL Office: CH2M-Hill SEA

Project Manager & Phone #: Mr. [ ] Ms. [ ] Dr. [ ] David Wilson

Report Copy to:

Requested Completion Date:

Sampling Requirements: SDWA NPDES RCRA OTHER

Sample Disposal: Dispose Return

LAB TEST CODES

SHADED AREA -- FOR LAB USE ONLY: Lab 1 # | Lab 2 # | Quote # | Kit Request # | Project # | No. of Samples | Page | of | COC Rev | Login | LIMS Ver | Ack Gen

'93 Sampling Date	Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	Total Nitrogen	Total Phosphorus	Sulfides	Total Volatile Solids	Percent Solids	Particle Size	Extra Volume	REMARKS	LAB 1 ID	LAB 2 ID
2/13	1145	X	X	X		I H - 3	1	X	X		X	X	X	X	8oz Glass	3020769	
		X	X	X		I N - 3	1			X					4oz Glass w ZnAc		
		X	X	X		I H - 3	1							X	16oz Poly		
2/13	1220	X	X	X		I H - 1	1	X	X		X	X	X		8oz Glass	3020770	
		X	X	X		I N - 1	1			X					4oz Glass w ZnAc		
		X	X	X		I N - 1	1							X	16oz Poly		
2/13	1320	X	X	X		I H - 2	1	X	X		X	X	X		8oz Glass	3020771	
		X	X	X		I H - 2	1			X					4oz Glass w ZnAc		
		X	X	X		I N - 2	1							X	16oz Poly		

Sampled By & Title: (Please sign and print name) | Date/Time: 2/13/93 1540

Relinquished By: (Please sign and print name) | Date/Time: 2/13/93

Received By: (Please sign and print name) Dave Lacher DAVE LACHER | Date/Time: 2/23/93 1000

Relinquished By: Dave Lacher DAVE LACHER (Please sign and print name) | Date/Time: 2123/93 11:15

Received By: (Please sign and print name) Dana Heinz DANA HEINZ NCA | Date/Time: 2/23/93 11:15

Relinquished By | Date/Time

Received By: (Please sign and print name) | Date/Time

Shipped Via: UPS BUS Fed-Ex Hand Other | Shipping #

Work Authorized By: (Please sign and print name)

Remarks

HAZWRAP/NESSA: Y N

QC Level: 1 2 3 Other:

COC Rec | ICE

Ana Req | TEMP

Cust Seal | Ph

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: ORIGINAL - LAB, Yellow - LAB, Pink - Client

REV 11/92 FORM 340

CH2M HILL

QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M HILL Project # | Purchase Order #

Project Name: Starkist / Samoa NPDES

Company Name/CH2M HILL Office: CH2M-Hill - SEA

Project Manager & Phone #: Mr. [ ] Ms. [ ] Dr. [ ] David Wilson

Report Copy to:

Requested Completion Date:

Sampling Requirements: SDWA NPDES RCRA OTHER

Sample Disposal: Dispose Return

LAB TEST CODES

SHADED AREA – FOR LAB USE ONLY

Lab 1 # | Lab 2 #

Quote # | Kit Request #

ANALYSES REQUESTED

Project #

No. of Samples | Page | of

COC Rev | Login | LIMS Ver | Ack Gen

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	Sulfide	Total Nitrogen	Total Phosphorus	Total Vol. Solids	% Solids	Particle Size	Extra Volume	REMARKS	LAB 1 ID	LAB 2 ID
2/13	1400	X		X		O H - 3	1	X							4oz Glass w ZnAc	302077~~6~~	772
		X		X		O H - 3	1		X	X	X	X	X		8oz Glass		
		X		X		O H - 3	1							X	16oz Poly		
2/13	1440	X		X		O H - 4	1	X							4oz Glass w ZnAc	302077~~5~~	
		X		X		O H - 4	1		X	X	X	X	X		8oz Glass		
		X		X		O H - 4	1							X	16oz Poly		
2/18	1130	X		X		O H - 2	1	X							4oz Glass w ZnAc	302077~~4~~	
		X		X		O H - 2	1		X	X	X	X	X		8oz Glass		
		X		X		O H - 2	1							X	16oz Poly		

Sampled By & Title (Please sign and print name)		Date/Time 2/18/93 1140	Relinquished By (Please sign and print name)	Date/Time 2/20/93	HAZWRAP/NESSA: Y N
Received By (Please sign and print name) Dave Lacher DAVE LACHER		Date/Time 2/23/93 1000	Relinquished By (Please sign and print name) Dave Lacher / DAVE LACHER	Date/Time 2/23/93 11:16	QC Level: 1 2 3 Other:
Received By (Please sign and print name) Dana Heinz DANA HEINZ NCA		Date/Time 2/23/93 11:15	Relinquished By (Please sign and print name)	Date/Time	COC Rec / ICE; Ana Req / TEMP; Cust Seal / Ph
Received By (Please sign and print name)		Date/Time	Shipped Via: UPS BUS Fed-Ex Hand Other	Shipping #	
Work Authorized By (Please sign and print name)		Remarks			

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: ORIGINAL - LAB, Yellow - LAB, Pink - Client

REV 11/92 FORM 340

CH2M HILL

QUALITY ANALYTICAL LABORATORIES

CHAIN OF CUSTODY RECORD AND AGREEMENT TO PERFORM SERVICES

CH2M HILL Project # | Purchase Order #

Project Name: Starkist/Samoa NPDES

Company Name/CH2M HILL Office: CH2M-Hill-SEA

Project Manager & Phone #: Mr. [ ] Ms. [ ] Dr. [ ] David Wilson

Report Copy to:

Requested Completion Date:

Sampling Requirements: SDWA [ ] NPDES [ ] RCRA [ ] OTHER [ ]

Sample Disposal: Dispose [ ] Return [ ]

Sampling Date	Sampling Time	Type COMP	Type GRAB	Matrix WATER	Matrix SOIL	CLIENT SAMPLE ID (9 CHARACTERS)	# OF CONTAINERS	Sulfides	Total Nitrogen	Total Phosphorus	Total Vol. Solids	% Solids	Particl Size	Total Vol.	REMARKS	LAB 1 ID	LAB 2 ID
2/18	12:30	X		X		O H - 1	1	X							4oz Glass w/ Zn Ac	302775	
↓	↓	X		X		O H - 1	1		X	X	X	X	X		8oz Glass		
↓	↓	X		X		O H - 1	1							X	16oz Poly		

LAB TEST CODES

ANALYSES REQUESTED

SHADED AREA -- FOR LAB USE ONLY

Lab 1 # | Lab 2 #

Quote # | Kit Request #

Project #

No. of Samples | Page | of

COC Rev | Login | LIMS Ver | Ack Gen

Sampled By & Title (Please sign and print name): [signature] Date/Time 12/18/93 1300

Received By (Please sign and print name): Dave Lacher DAVE LACHER Date/Time 2/23/93 1000

Received By (Please sign and print name): Dana Heine DANA HEINE 2/23/93 NCA 11:15 Date/Time 2/23/93 11:15

Received By (Please sign and print name): Date/Time

Relinquished By (Please sign and print name): [signature] Date/Time 2/23/93

Relinquished By (Please sign and print name): Dave Lacher DAVE LACHER Date/Time 2/23/93 11:10

Relinquished By (Please sign and print name): Date/Time

HAZWRAP/NESSA: Y N

QC Level: 1 2 3 Other:

COC Rec | ICE

Ana Req | TEMP

Cust Seal | Ph

Shipped Via: UPS BUS Fed-Ex Hand Other

Shipping #

Work Authorized By (Please sign and print name)

Remarks

Instructions and Agreement Provisions on Reverse Side

DISTRIBUTION: ORIGINAL - LAB, Yellow - LAB, Pink - Client

REV 11/92 FORM 340

ATTACHMENT II

LABORATORY DATA REPORT
North Creek Analytical Laboratory

Marine Sediment Samples from Pago Pago Harbor, American Samoa
February 1993

STARKIST SAMOA, Inc. and VCS SAMOA PACKING COMPANY

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES		
777 108th Avenue NE	Matrix:	Soil		
Bellevue, WA 98009	Analysis for:	Moisture Content	Received:	Feb 23, 1993
Attention: David Wilson	First Sample #:	302-0769	Reported:	Mar 9, 1993

LABORATORY ANALYSIS FOR: Moisture Content

Sample Number	Sample Description	Total Solids %	Moisture Content %
302-0769	IH-3	30	70
302-0770	IH-1	26	74
302-0771	IH-2	45	55
302-0772	OH-3	58	42
302-0773	OH-4	69	31
302-0774	OH-2	59	41
302-0775	OH-1	60	40

The enclosed analytical results for soils, sediments and sludges have been converted to a DRY WEIGHT reporting basis.
To attain the wet weight "as received" equivalent, multiply the dry weight result by the decimal fraction of percent Total Solids.
The results in this report apply only to the samples analyzed, as indicated on the custody document.
This analytical report is to be reproduced only in its entirety.

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101· Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Analysis Method:	EPA 351.3	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis for:	Total Kjeldahl Nitrogen	Analyzed:	Mar 2, 1993
Attention: David Wilson	First Sample #:	302-0769	Reported:	Mar 9, 1993

LABORATORY ANALYSIS FOR: Total Kjeldahl Nitrogen

Sample Number	Sample Description	Reporting Limit mg/kg (ppm)	Sample Result mg/kg
302-0769	IH-3	1.0	1,100
302-0770	IH-1	1.0	1,700
302-0771	IH-2	1.0	770
302-0772	OH-3	1.0	410
302-0773	OH-4	1.0	470
302-0774	OH-2 2/18/93	1.0	470
302-0775	OH-1 2/18/93	1.0	480
BLK030293	Method Blank	1.0	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.
The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

Please Note:
Report was amended on March 23, 1993.

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Analysis Method:	EPA 6010	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis for:	Total Phosphorus	Analyzed:	Feb 25, 1993
Attention: David Wilson	First Sample #:	302-0769	Reported:	Mar 9, 1993

LABORATORY ANALYSIS FOR: Total Phosphorus

Sample Number	Sample Description	Reporting Limit mg/kg (ppm)	Sample Result mg/kg
302-0769	IH-3	10	1,500
302-0770	IH-1	10	1,200
302-0771	IH-2	10	1,100
302-0772	OH-3	10	530
302-0773	OH-4	10	470
302-0774	OH-2 2/18/93	10	570
302-0775	OH-1 2/18/93	10	600
BLK022593	Method Blank	10	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.
The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Analysis Method:	PSDDA Conventionals	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis for:	Sulfide	Analyzed:	Feb 25, 1993
Attention: David Wilson	First Sample #:	302-0769	Reported:	Mar 9, 1993

LABORATORY ANALYSIS FOR: Sulfide

Sample Number	Sample Description	Reporting Limit mg/kg (ppm)	Sample Result mg/kg
302-0769	IH-3	0.12	34
302-0770	IH-1	0.12	41
302-0771	IH-2	0.12	22
302-0772	OH-3	0.12	N.D.
302-0773	OH-4	0.12	N.D.
302-0774	OH-2 2/18/93	0.12	0.46
302-0775	OH-1 2/18/93	0.12	0.75
BLK022593	Method Blank	0.12	N.D.

Analytes reported as N.D. were not detected above the stated Reporting Limit.
The results reported above are on a dry weight basis.

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Sample Descript:	Sediment, IH-3	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis Method:	ASTM D422-63	Analyzed:	Feb 24, 1993
Attention: David Wilson	Sample Number:	302-0769	Reported:	Mar 9, 1993

LABORATORY ANALYSIS: PARTICLE SIZE DISTRIBUTION

Sieve Size	Hydrometer < Phi Size	Particle Size microns	Passing %	Fractional %
4		>4750	100	0
10		4750 - 2000	98	2
20		2000 - 850	96	2
40		850 - 425	93	3
60		425 - 250	89	5
140		250 - 106	75	14
200		106 - 75	70	5
230		75 - 62.5	68	2
	4	62.5 - 31.2	22	46
	5	31.2 - 15.6	16	5
	6	15.6 - 7.8	5	11
	7	7.8 - 3.9	0	5
	8	3.9 - 1.9	0	0
	9	1.9 - 0.9	0	0
	10	<0.9	0	0

Total Solids, %: 30
Total Volatile Solids, %: 14

NORTH CREEK ANALYTICAL, Inc.

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
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CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Sample Descript:	Sediment, IH-1	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis Method:	ASTM D422-63	Analyzed:	Feb 24, 1993
Attention: David Wilson	Sample Number:	302-0770	Reported:	Mar 9, 1993

LABORATORY ANALYSIS: PARTICLE SIZE DISTRIBUTION

Sieve Size	Hydrometer < Phi Size	Particle Size microns	Passing %	Fractional %
4		>4750	97	3
10		4750 - 2000	96	1
20		2000 - 850	92	4
40		850 - 425	84	8
60		425 - 250	79	5
140		250 - 106	71	8
200		106 - 75	70	1
230		75 - 62.5	70	0
	4	62.5 - 31.2	16	54
	5	31.2 - 15.6	11	5
	6	15.6 - 7.8	5	6
	7	7.8 - 3.9	0	5
	8	3.9 - 1.9	0	0
	9	1.9 - 0.9	0	0
	10	<0.9	0	0

Total Solids, %: 27
Total Volatile Solids, %: 19

NORTH CREEK ANALYTICAL, Inc.

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Sample Descript:	Sediment, IH-2	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis Method:	ASTM D422-63	Analyzed:	Feb 24, 1993
Attention: David Wilson	Sample Number:	302-0771	Reported:	Mar 9, 1993

LABORATORY ANALYSIS: PARTICLE SIZE DISTRIBUTION

Sieve Size	Hydrometer < Phi Size	Particle Size microns	Passing %	Fractional %
4		>4750	100	0
10		4750 - 2000	100	0
20		2000 - 850	100	0
40		850 - 425	99	0
60		425 - 250	99	1
140		250 - 106	96	2
200		106 - 75	94	3
230		75 - 62.5	92	2
	4	62.5 - 31.2	50	42
	5	31.2 - 15.6	22	28
	6	15.6 - 7.8	9	13
	7	7.8 - 3.9	6	3
	8	3.9 - 1.9	3	3
	9	1.9 - 0.9	0	3
	10	<0.9	0	0

Total Solids, %: 45
Total Volatile Solids, %: 9.3

NORTH CREEK ANALYTICAL, Inc

Please Note:
Report was amended on March 19, 1993.

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101· Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Sample Descript:	Sediment, OH-3	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis Method:	ASTM D422-63	Analyzed:	Feb 24, 1993
Attention: David Wilson	Sample Number:	302-0772	Reported:	Mar 9, 1993

LABORATORY ANALYSIS: PARTICLE SIZE DISTRIBUTION

Sieve Size	Hydrometer < Phi Size	Particle Size microns	Passing %	Fractional %
4		>4750	86	14
10		4750 - 2000	62	24
20		2000 - 850	52	10
40		850 - 425	45	7
60		425 - 250	38	7
140		250 - 106	18	20
200		106 - 75	12	6
230		75 - 62.5	10	2
	4	62.5 - 31.2	2	8
	5	31.2 - 15.6	1	1
	6	15.6 - 7.8	1	0
	7	7.8 - 3.9	1	0
	8	3.9 - 1.9	1	0
	9	1.9 - 0.9	0	1
	10	<0.9	0	0

Total Solids, %: 58
Total Volatile Solids, %: 3.1

NORTH CREEK ANALYTICAL, Inc.

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

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CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 13, 1993
777 108th Avenue NE	Sample Descript:	Sediment, OH-4	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis Method:	ASTM D422-63	Analyzed:	Feb 24, 1993
Attention: David Wilson	Sample Number:	302-0773	Reported:	Mar 9, 1993

LABORATORY ANALYSIS: PARTICLE SIZE DISTRIBUTION

Sieve Size	Hydrometer < Phi Size	Particle Size microns	Passing %	Fractional %
4		>4750	97	3
10		4750 - 2000	89	8
20		2000 - 850	75	14
40		850 - 425	62	13
60		425 - 250	57	5
140		250 - 106	50	7
200		106 - 75	46	4
230		75 - 62.5	44	2
	4	62.5 - 31.2	20	24
	5	31.2 - 15.6	7	13
	6	15.6 - 7.8	3	4
	7	7.8 - 3.9	1	2
	8	3.9 - 1.9	1	0
	9	1.9 - 0.9	0	1
	10	<0.9	0	0

Total Solids, %: 69
Total Volatile Solids, %: 4.2

NORTH CREEK ANALYTICAL, Inc.

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 18, 1993
777 108th Avenue NE	Sample Descript:	Sediment, OH-2	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis Method:	ASTM D422-63	Analyzed:	Feb 24, 1993
Attention: David Wilson	Sample Number:	302-0774	Reported:	Mar 9, 1993

LABORATORY ANALYSIS: PARTICLE SIZE DISTRIBUTION

Sieve Size	Hydrometer < Phi Size	Particle Size microns	Passing %	Fractional %
4		>4750	100	0
10		4750 - 2000	100	0
20		2000 - 850	100	0
40		850 - 425	100	0
60		425 - 250	99	1
140		250 - 106	95	4
200		106 - 75	87	8
230		75 - 62.5	82	6
	4	62.5 - 31.2	22	60
	5	31.2 - 15.6	17	5
	6	15.6 - 7.8	10	7
	7	7.8 - 3.9	2	7
	8	3.9 - 1.9	0	2
	9	1.9 - 0.9	0	0
	10	<0.9	0	0

Total Solids, %: 59
Total Volatile Solids, %: 4.9

NORTH CREEK ANALYTICAL, Inc.

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill	Client Project ID:	Starkist/Samoa NPDES	Sampled:	Feb 18, 1993
777 108th Avenue NE	Sample Descript:	Sediment, OH-1	Received:	Feb 23, 1993
Bellevue, WA 98009	Analysis Method:	ASTM D422-63	Analyzed:	Feb 24, 1993
Attention: David Wilson	Sample Number:	302-0775	Reported:	Mar 9, 1993

LABORATORY ANALYSIS: PARTICLE SIZE DISTRIBUTION

Sieve Size	Hydrometer < Phi Size	Particle Size microns	Passing %	Fractional %
4		>4750	100	0
10		4750 - 2000	100	0
20		2000 - 850	100	0
40		850 - 425	100	0
60		425 - 250	99	1
140		250 - 106	97	2
200		106 - 75	93	4
230		75 - 62.5	89	4
	4	62.5 - 31.2	30	59
	5	31.2 - 15.6	21	9
	6	15.6 - 7.8	12	9
	7	7.8 - 3.9	6	6
	8	3.9 - 1.9	3	3
	9	1.9 - 0.9	0	3
	10	<0.9	0	0

Total Solids, %: 60
Total Volatile Solids, %: 5.6

NORTH CREEK ANALYTICAL, Inc.

Steven G. Mayer
Project Manager

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill
777 108th Avenue NE
Bellevue, WA 98009
Attention: David Wilson

Client Project ID: Starkist/Samoa NPDES
Sample Matrix : Soil
Units: mg/kg (ppm)

Analyst: K. Arvon

Reported: Mar 9, 1993

INORGANIC QUALITY CONTROL DATA REPORT

ANALYTE	Phosphorus	Sulfide
EPA Method:	6010	PSDDA
Date Analyzed:	Feb 25, 1993	Feb 25, 1993
ACCURACY ASSESSMENT		
LCS Spike Conc. Added:	500	5.0
LCS Spike Result:	390	4.7
LCS Spike % Recovery:	78	94
Upper Control Limit:	125	125
Lower Control Limit:	75	75
PRECISION ASSESSMENT		
Sample #:	302-0772	302-0775
Original:	310	0.75
Duplicate:	200	0.66
Relative % Difference:	43, Q-6	13
Maximum RPD:	25	25

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

Please Note:
Q-6 = The RPD value for this QC sample is outside of the NCA established control limits.

NORTH CREEK ANALYTICAL

18939 120th Avenue N.E., Suite 101 · Bothell, WA 98011-2569
Phone (206) 481-9200 · FAX (206) 485-2992

CH2M Hill
777 108th Avenue NE
Bellevue, WA 98009
Attention: David Wilson

Client Project ID: Starkist/Samoa NPDES
Sample Matrix : Soil
Units: mg/kg (ppm)

Analyst: K. Arvon

Reported: Mar 25, 1993

INORGANIC QUALITY CONTROL DATA REPORT

ANALYTE	Total Kjeldahl Nitrogen

EPA Method: 351.3
Date Analyzed: Mar 23, 1993

ACCURACY ASSESSMENT

LCS Spike Conc. Added:	500
LCS Spike Result:	476
LCS Spike % Recovery:	95
Upper Control Limit:	125
Lower Control Limit:	75

PRECISION ASSESSMENT

Sample #:	302-0773
Original:	460
Duplicate:	460
Relative % Difference:	0.0
Maximum RPD:	25

NORTH CREEK ANALYTICAL inc

Steven G. Mayer
Project Manager

STAR-KIST SAMOA, INC.

STORM WATER POLLUTION PREVENTION PLAN

MULTI-SECTOR GENERAL PERMIT (MSGP)

REVISED FEBRUARY 2001

Star-Kist Samoa, Inc.
P.O Box 368
Pago Pago AS. 96799
Phone: (684) 644-4231

U.S. ENVIRONMENTAL PROTECTION AGENCY (EPA)
NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES)
STORM WATER NOTICE OF INTENT CENTER

ASR05A001

Dear Operator: **03/14/2001**

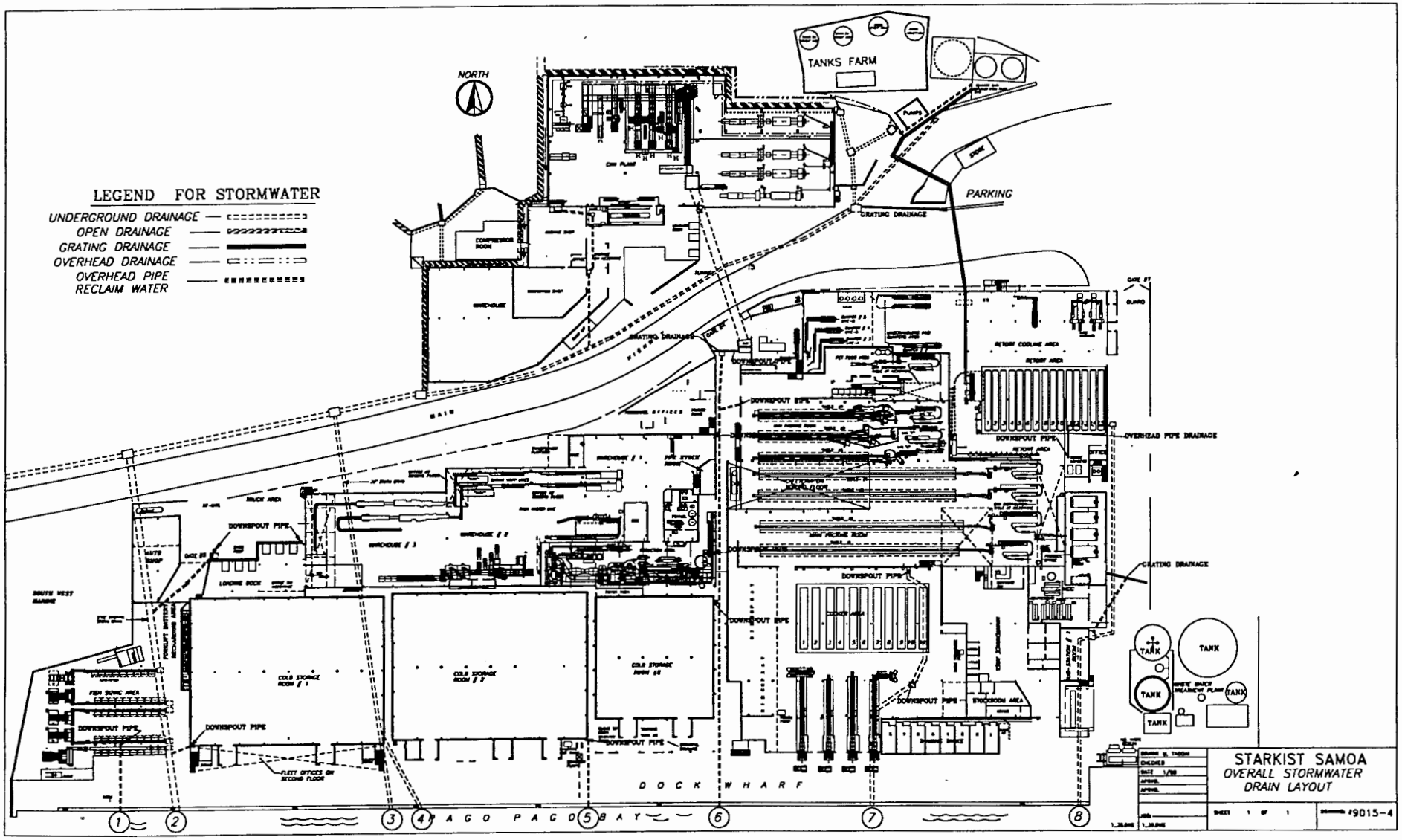
The EPA has processed your Notice of Intent (NOI) application for the facility noted below. **This facility is authorized to discharge storm water associated with multi-sector activity under the terms and conditions imposed by the EPA's NPDES Storm Water Multi-Sector Permit.** The facility permit number is listed above and the active date of permit coverage is 1/24/2001.

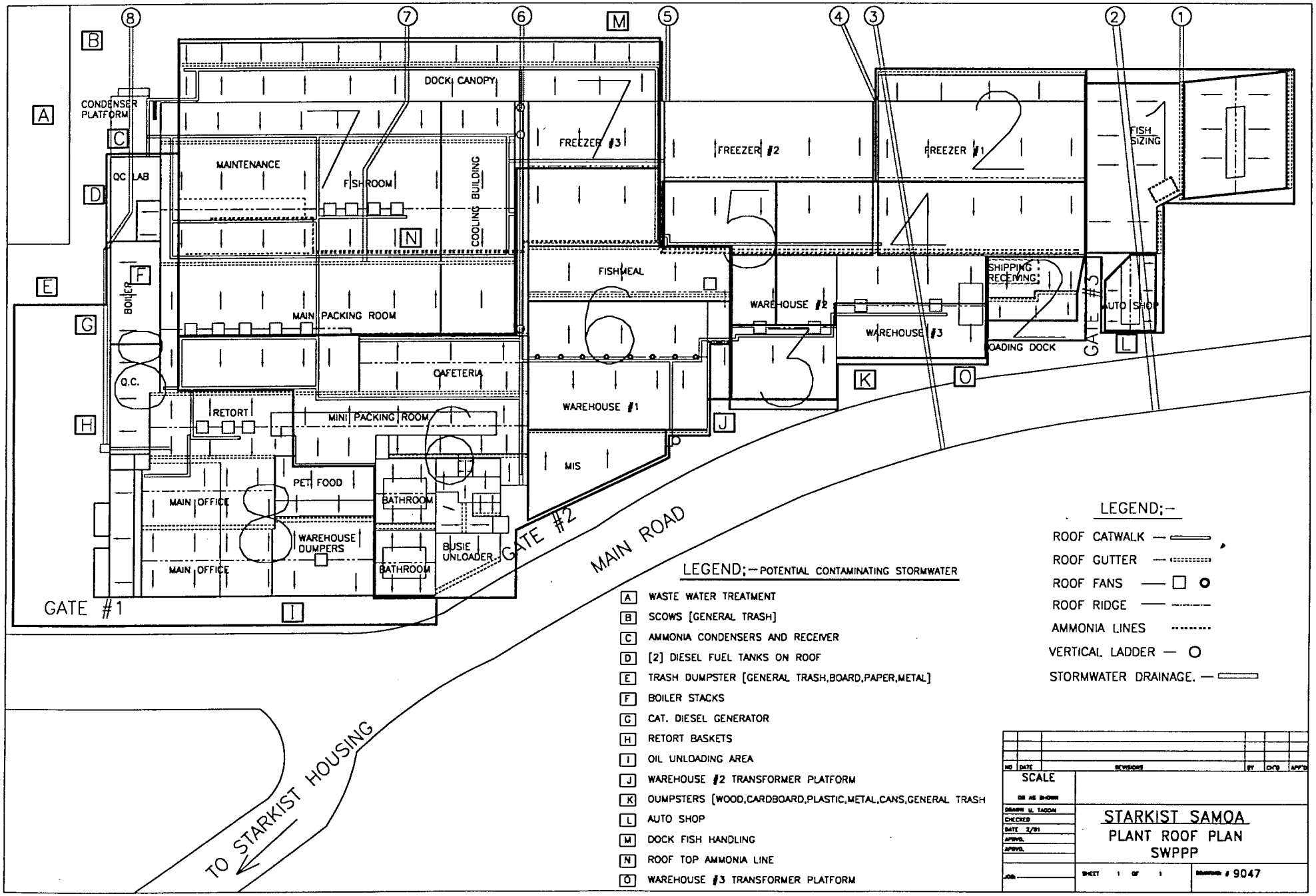
EPA's multi-sector permit requires certain pollution prevention and control measures, possible monitoring and reporting, and annual inspections. Among the conditions and requirements of this permit, you must prepare and implement a pollution prevention plan (PPP) that is tailored to your industrial site. You may also be required to submit monitoring data for your facility's storm water discharges. As a facility authorized to discharge under this storm water multi-sector permit, all terms and conditions must be complied with to maintain coverage and avoid possible penalties.

FACILITY:
STARKIST SAMOA INC
MAIN STREET
PAGO PAGO, AS
96799

OPERATOR:
STARKIST SAMOA INC
PO BOX 368
PAGO PAGO, AS
96799

To obtain a copy of the EPA's storm water multi-sector permit terms and conditions to which you are now held accountable, please call the EPA Office of Water Resource Center at (202) 260-7786. If you have general questions concerning the storm water program, please call the EPA Region **09** contact: **Eugene Bromley, (415) 744-1906.**


LEGEND FOR STORMWATER
UNDERGROUND DRAINAGE
OPEN DRAINAGE
GRATING DRAINAGE
OVERHEAD DRAINAGE
OVERHEAD PIPE
RECLAIM WATER
NORTH
TANKS FARM
PARKING
GRATING DRAINAGE
DOWNSPOUT PIPE
OVERHEAD PIPE DRAINAGE
TANK
DOCK WHARF
PAGO PAGO BAY
STARKIST SAMOA
OVERALL STORMWATER
DRAIN LAYOUT
#9015-4



LEGEND;- POTENTIAL CONTAMINATING STORMWATER

- A WASTE WATER TREATMENT
- B SCOWS [GENERAL TRASH]
- C AMMONIA CONDENSERS AND RECEIVER
- D [2] DIESEL FUEL TANKS ON ROOF
- E TRASH DUMPSTER [GENERAL TRASH,BOARD,PAPER,METAL]
- F BOILER STACKS
- G CAT. DIESEL GENERATOR
- H RETORT BASKETS
- I OIL UNLOADING AREA
- J WAREHOUSE #2 TRANSFORMER PLATFORM
- K DUMPSTERS [WOOD,CARDBOARD,PLASTIC,METAL,CANS,GENERAL TRASH
- L AUTO SHOP
- M DOCK FISH HANDLING
- N ROOF TOP AMMONIA LINE
- O WAREHOUSE #3 TRANSFORMER PLATFORM

LEGEND;-

- ROOF CATWALK
- ROOF GUTTER
- ROOF FANS
- ROOF RIDGE
- AMMONIA LINES
- VERTICAL LADDER
- STORMWATER DRAINAGE.

NO	DATE	REVISIONS	BY	CK'D	APP'D

SCALE

DRAWN: LL TAGOAI
CHECKED
DATE 3/01
APPVD.
APPVD.
JOB

STARKIST SAMOA
PLANT ROOF PLAN SWPPP

SHEET 1 OF 1

DRAWING # 9047

Table of Contents

SECTION I

Introduction and Overview

Star-Kist Samoa, Inc. is a supplier of canned tuna; it is one of the divisions of Star-Kist Sea Food Inc., a Subsidiary of the H.J. Heinz Company. Star-Kist is head quartered in Pittsburg, Pennsylvania. Star-Kist Samoa, Inc. operates a Fish Canning Plant in Atu'u, Pago Pago American Samoa. Canned tuna such as Albacore, Yellow fin, Big Eye and Skipjack in water with broth or in oil are manufactured in this facility. All of the manufacturing operations are conducted inside the building. However, some related activities such as unloading of the vessels and wastewater treatment occur outside. In this case there is a slight possibility of the risk of storm water pollution from the facility. All the storm water runoff will be discharged in Pago Pago Harbor. The plant has in place a Storm Water Pollution Prevention Plan to prevent process water or other possible discharge pollutant associated with the food processing facility from coming in contact with storm water, which discharges directly into the receiving waters of Pago Pago Harbor.

The storm water permitting program in the Territory of American Samoa is administered by the U.S Environmental protection Agency (EPA) under the National Pollutant Discharge Elimination System (NPDES) authorized under the Federal Clean Water Act and associated regulations. EPA rules that govern NPDES permits for storm water program for industrial activities are contained in the Code of Federal Regulations under 40 CFR 122.26(b)(14). Star-Kist Samoa, Inc. Storm Water Pollution Prevention Plan has been prepared pursuant to the requirements of EPA's Storm Water Multi-Sector Permit #ASR05A001.

The draft MSGP was proposed by EPA on November 19, 1993 (58 FR 61146), and American Samoa was proposed to be included among the areas of coverage of the MSGP. However, at the time of issuance of the final MSGP for most areas (September 29, 1995), the American Samoa EPA had not completed its review pursuant to section 401 of the CWA. As such, EPA did not issue the MSGP for American Samoa.

On October 6, 1997 the American Samoa EPA provided its 401 certifications for the MSGP. The certifications also include certain special conditions necessary to ensure compliance with CWA. On September 30, 1998 EPA issued a notification that the Baseline General permit would be terminated on December 31, 1998 and that facilities would have to seek NPDES coverage under the Agency's Multi-Sector General Permit (MSGP). The MSGP became effective on October 1, 1995 and was revised by EPA on September 30, 1998. American Samoa is included in the listed facilities that are covered by the MSGP pursuant to the September 30, 1998 Final Notification of the NPDES

Storm Water MSGP for Industrial Activities. On October 30, 2000 the Final Reissuance of the NPDES Storm Water MSGP for Industrial Activities was published in the Federal Register. American Samoa is covered under the new MSGP.

This SWPPP is intended to address each of the elements in Section 4 of the MSGP, which specifies the content of the Pollution Prevention Plan. Each EPA General Permit requirement is highlighted in a text box. A narrative, tables, and other information that detail the facility's Pollution Prevention Plan follow each box.

SECTION II

Pollution Prevention Team. Each plan shall identify a specific individual or individuals within the facility organization as member of a Storm Pollution Prevention Team that are responsible for developing the storm water pollution prevention plan and assisting the facility or plant Manager in its implementation, maintenance, and revision. The plan shall clearly identify the responsibilities of each team member. The activities and responsibilities of the team shall address all aspect of the facility's storm water pollution plan.

STORM WATER POLLUTION TEAM

Mr. Phil Thirkell, as the Plant Manager and Officer of the facility, has overall responsibilities for ensuring that the SWPPP is developed, maintained, and updated on a regular basis.

The following individual are members of this team; their responsibilities and contact numbers are listed in Table 1.

TABLE 1

TEAM MEMBER	RESPONSIBILITY	PHONE
Lance Ihaka Manager, Engineering	-Approval for engineering/maintenance projects involving the structures and equipment relevant to SWPP and SPCC. -Have signatory responsibility associated with the plant engineering/maintenance project.	Work- 644-4231 Ext. 362 Cellular- 258-3234
Joe Carney Department Head, Utilities	-Administration of overall compliance with the storm water permit. -Record retention, periodic review and update of SWPPP.	Work-644-4231 Ext.354 Cellular- 733-1819

	-Responsible for the operation of the wastewater treatment. -Participate in annual compliance review. -General site supervision to clean debris and spills in all the areas of the facility. -Maintenance of all the storm water runoff.	
Leslie Johansson Utilities Supervisor	-Implementation of the Preventive Maintenance Program. -Supervision in the operations of response in the event of spillage of waste product in areas exposed to storm water.	Work- 644-4231 Ext. 376
Ma. Theresa Pastorfide EPA Specialist	-Keeping and organizing all the records pertaining the SWPPP and other relevant reports. -Assist with the collection of storm water sampling. -Participate with annual training and compliance review. -Periodic site inspection. -Participate in the review and update of SWPPP.	Work- 644-4231 Ext. 357
Lesina Sivatia WWTP Hourly Supervisor	-Supervision of WWTP on a daily basis. -Participate in the storm water sampling. -Analysis of grab sample.	Work- 644-4231 Ext. 398
WWTP Operator	-Participate in spill response and routine housekeeping. -Responsible in collecting the grab sample in the entire storm water outfall.	Work- 644-4231 Ext. 398
Vao Ricky Tavui Utilities Safety Champion	-Responsible in implementing the good house keeping practice. -Monitoring the safe handling and pollution prevention practice during receiving and storing chemicals and supplies.	Work- 644-4231 Ext.376
John Brown Corporate	-Assist with periodic inspection and training -Advise team member regarding compliance questions and issues -Participate in annual compliance review -Assist with review and update of SWPPP	Work- (208) 383-6557

NOTE:

Mr. Phil Thirkell, the Plant manager, is the team leader.

SECTION III

3.0 General Location Map, Site Map and Drainage Description

Drainage- A site map indicating the pattern of storm water drainage, existing structural control measures to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, and location where major spills or leaks identified under Part XI. U.3.a. (2)(c) (Spills and Leaks) of this permit have occurred since 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit. The map must also indicate the locations of all industrial activities that are exposed to precipitation, including, but not limited to: loading/Unloading areas; waste treatment, storage and disposal locations; liquid storage tanks; vent and stacks from cooking, drying and similar operations, spoiled product and broken product container storage areas; significant dust or particulate generating areas; and any other processing and storage areas expose to storm water. Flows with a significant potential for causing erosion shall also be identified. In addition, the site map must identify monitoring locations. In addition, the map must indicate the outfall locations and the types of discharges contained in the drainage areas of the outfalls.

The (2) site maps in Appendix B illustrate the facilities structures, overall storm water drainage pattern, process water drain layout, industrial activities that may be exposed to precipitation, storm water outfalls, the sampling site/locations, the flow of the runoff, roof drains and division of the roofing areas runoff by outfalls of the facility, storage areas, tank farm located on the hillside across the public roadway, the west and east area of dock wharf where the handling and the unloading of the fish occur, and Pago Pago Bay that receives the storm water runoffs.

In the event of excess storm water, there is a wastewater drainage ditch along the length of the dock area, which drains, into a sump near the butchering area. The dock also has an 8-inch berm that prevents any storm water or process water from reaching the bay. Any spillage on the dock will drain into the sump and be pumped to the wastewater treatment plant. Additional description of the eight (8) outfalls and respective drainage areas are presented in Table 3.

TABLE 2

OUTFALLS	TOTAL AREA (sq. ft.)	DESCRIPTION OF DRAINAGE AREA
001	19,575	Fish Sizing Area, Auto Shop
002	17,550	Main Road Way, Shipping and Receiving Area, Freezer #1 (halfway)
003	12,150	Ware House #3, Main Road Way
004	22,950	Freezer #1 and Freezer #2(halfway roof drains), (Partial roof drains) Ware House #3 and Ware House #2
005	6,885	Partial Roof drains – Freezer #2 and Ware House #2
006	67,529	Roof drains- MIS, Ware House #1, Fish Meal, Busies Unloader, Packing Room (Bathroom), Mini Packing Room, Cafeteria
007	76,500	Roof drains- Main packing Room, Maintenance Area, Fish Room, Dock Canopy, Cooling Building Freezer #3
008	70,785	Roof drains- Ware House Dumper, Pet Food, Retort, Main Office, Quality Control Offices, Boiler, QC Lab Employees Parking Lot, Alley #1 (Gate 1)

OUTFALL #1

All the runoff in the west alley area from the roofing will drain into the downspout located in the middle of the sizing area. The downspout was sealed to prevent the process water from the sizing area coming in contact with the storm water outfall. The excess rain water from the loading area of Shipping and Receiving Area that flows into the auto shop area in the west alley will be collected in the waste water drain along the dock area to be processed directly in the waste water treatment plant.

OUTFALL #2

This is a 4' by 2' concrete outfall that originates from the public roadway and extends underneath the west alleyway on the site. It carries runoff from the roof drains of shipping and receiving area and loading dock.

OUTFALL #3

This storm water outfall originates from the public roadway and runs underneath warehouse #3 and cold storage room #1.Since there are no connecting points on the site, there is no possibility of process water coming in contact with storm water in the outfall.

OUTFALL #4

This Outfall carries rainwater from the lower roof drains half way around Freezer's #2 and #3 and Warehouse #3 and #2. The down spout pipe is located between Freezer #2 and #3 which was sealed to prevent process water from coming in contact with storm water out fall.

OUTFALL #5

The outfall carries rainwater from the roof drains of freezer #2 and warehouse #2. Rainwater will drain in the downspout pipe and will go through the underground drainage. Seawater pumps are surrounded by 6" by 6" berm to prevent process water entering the bay.

OUTFALL #6

This outfall starts at the entrance of gate 2; runoff from the public roadway will flow in the grating drainage that runs under alley #2. This outfall carries rainwater from the roofs that will drain into the downspouts located in the can tower, inside packing room across table #7, MIS area, and two downspouts in the fishmeal area. All roof downspouts and cross grating areas are sealed to prevent process water from inadvertently entering the storm water drains. The excess rainwater that will flow into alley #2 will be diverted into the waste water drain along the dock area and will be pumped into the sump pit that will be processed in the waste water treatment plant.

OUTFALL #7

This outfall carries rainwater from the roofs of the packing room. Seals are placed around all the downspouts as assurance to prevent process water from getting into the storm water.

OUTFALL #8

This Existing outfall originates from Samoa Packing's Shipping and Receiving area and runs underneath the East Alley, which is a public access road between the two canneries. In addition to carrying Samoa Packing truck dock water, this outfall also collects roof water from Samoa packing, which runs on the alley. Near the boiler area, there is a storm water drain, which connects to outfall #8. The CAT Diesel Generator, trash dumpster and retort baskets staging area are located in this alley before the storm water grating drainage across the boiler area.

The Materials that are stored, handled or used on-site and which have the potential to be released with storm water discharge are presented in Table 2., which are located in the following areas:

1. **The Tank Farm behind the can plant**
2. **The Waste Water Treatment Plant**

TABLE 3

TANKS	CAPACITY (GALS.)	PURPOSE	LOCATIONS
2 Soybean Oil Tanks	42,000	Oil Product	Tank Farm
2 Fuel Tanks	42,300	Diesel Storage	Tank Farm
Water tank	185,000	Fire Fighting	Tank Farm
1 Recovered Water Tank	39,700	Retort Recovered Water	Tank Farm
1 Surge Tank	200,000	Process Water	Waste Water Treatment Area
1 Sludge Tank	86,000	Collects Sludge from D.A.F.	Waste Water Treatment Area
1 High Strength Tank	200,000	Cookers Juices, Process Liquor and DAF Sludge	Waste Water Treatment Area

The integrity of these tanks is checked on a regular basis. Preventive maintenance performed on all tanks is documented by the Utilities Department and filed by EPA Specialist within the Engineering Department.

Small quantities of wastewater treatment chemicals such as aluminum sulfate and polymer are kept outdoors for immediate use behind the wastewater treatment plant.

In December 1997, a trench drain with sump pump was constructed adjacent to the WWTP Chemical Storage to contain any chemical spill that might occur. The contents of the trench drain pumped through the feed lines leading to the DAF cell for treatment. All the tanks located in WasteWater Treatment Area, in the event of any spill will flow directly into the process wastewater drainage for treatment. Inspection and Maintenance of the tanks are done routinely; operators are working every shift monitoring the levels of the tanks.

The Tank Farm was constructed with dike area for containment of any possible spill of salad oil or fuel oil. The dike capacity can hold up to 52,200 gallons of oil. The dike area is regularly checked for possible rainwater build up. The rainwater in the containment area will be pump into the sump pit and will go to the wastewater treatment plant to be processed. There is no possibility of the salad oil and fuel oil to be in contact with storm water discharge.

3.2 Inventory of Exposed Materials

Inventory of Exposed Materials- An inventory of the types of materials handled at the site that potentially may be exposed to precipitation. Such inventory shall include a narrative description of significant materials that have been handled, treated, stored or disposed in a manner to allow exposure to storm water between the time of 3 years prior to the date of submission of a Notice of Intent (NOI) to be covered under this permit and the present; method and location of onsite storage or disposal; materials management practices employed to minimize contact of materials with storm water runoff between the time of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit and the present; the location and description of existing structural and nonstructural control measures to reduce pollutants in storm water runoff; and a description of any treatment the storm water receives.

Waste Water Treatment Plant

This area is located in the East Side of the Dock wharf that will receive all the process water. The dock from the West Side to the East Side was constructed with a wastewater drainage ditch, which drains process water into a sump pit along alley 2, near the butchering building and will pump directly into the WWTP. The most likely pollution that will occur in this area is the possible overflow of treated clean water that will flow directly into the wastewater drainage ditch that will flow into the sump pit and will be pump into the WWTP for reprocessing. Chemical Storage area at the back of the WWTP has a slight possibility of spill, however in the event of spill or leak the chemicals will flow directly into the trench drainage and will be pumped through the feed lines leading to the DAF cell for treatment. Monitoring of cleanliness in this area is being maintained.

Scows (General Trash)

This dumpster is located along the WWTP. Potential spillage that will occur will flow directly into the WWT drainage ditch for treatment. General trash includes papers, cardboard, empty drums, cans, wood, electrical wiring and metal. Debris will be washed out after the sanitation department dumps the contents of all the scows into the container located along the Boiler area that will be hauled to the landfill. Empty drums will be cut in half before disposal to avoid any occurrence of spill. Color-coding was implemented in disposal; red scows designate trash that is limited metals only, empty metal drums and cans; the yellow scows cover the paper or cardboard, empty plastic drums, wood and etc.

3.3 Spills and Leaks

Spills and Leak- A list of significant spills and significant leaks of toxic or hazardous pollutants that occurred at areas that are exposed to precipitation or that otherwise drain to a storm water conveyance at the facility after the date of 3 years prior to the date of the submission of a Notice of Intent (NOI) to be covered under this permit. Such list shall be updated as appropriate during the term of the permit.

There have been no spills of any toxic chemicals or hazardous materials that discharged to the storm water system or releases of any other substances in reportable quantities within the past 3 years. All reports regarding past incident are kept on file in the Engineering Department.

3.4 Sampling Data

Sampling Data- a summary of existing discharge-sampling data describing pollutants in storm water discharges from the facility, including a summary of sampling data collected during the term of this permit.

This Facility is not required to conduct laboratory analysis of storm water under the MSGP, so no sampling data is available.

3.5 Summary of Potential Pollutant Sources

Summary of Potential Pollutant Sources- the description of potential pollutant sources culminates in a narrative assessment of the risk potential that the industrial activities, materials, and physical features of the site, as identified in XI.3.a. (2)(a) (drainage), pose to storm water quality. The description shall specifically list any significant potential source pollutants at the site and for each potential source, any pollutant or pollutant parameter (e.g., biochemical oxygen demand, oil and grease, etc.) of concern shall be identified.
In addition to food and kindred products processing-related industrial activities, the plan must also describe application/ storage of pest control chemicals (e.g., rodenticides, insecticides, fungicides, and others) used on plant grounds, including a description of pest control application and chemical storage practices.

A listing of potential pollutant sources is listed in Table 4. Inspection of the potential areas that pollutant sources may be released in significant quantities has been evaluated. The amount of pollutant that was considered to be in significant quantities will depend upon the type of materials or activity the facility used. The ranking of risk potential for pollutants to be present in significant quantities in the storm water discharge is determined by applying a series of criteria to each potential pollutant source. The criteria are as follows:

- **Presence of materials in significant quantities exposed to storm water;**
- **The potential of exposure through spills or leaks;**
- **Existing structural control (e.g. berms and cover) and non-structural controls (e.g. housekeeping and materials management practices);**
- **Whether the materials are mobile;**
- **The distance and accessibility to the storm water conveyance system (i.e. Can the material be contained and cleaned up prior to entering the storm drain system?)**

Using these criteria the following risk classifications were determined:

"None" **-Pollutant is not present in significant quantities, or significant quantities are not exposed to storm water, nor do they have the potential for exposure to storm water through leaks or spills,**

"Low" **-Significant quantities of pollutant are only exposed to storm water by leaks or spills, and structural controls are adequate to prevent contamination of storm water;**

"Medium" **-Significant quantities of the materials are exposed to storm water and structural controls are adequate to prevent contamination of storm water, or significant quantities of pollutant are only exposed to storm water through leaks and spills and structural controls are ineffective in preventing contamination of the storm water;**

"High" **-Significant quantities of the materials are exposed to storm water and structural controls are inadequate to prevent contamination of storm water, includes areas with evidence of historical spills.**

An evaluation of the risk of storm water contamination and potential pollutant from each key area of the facility is presented in Table 4.

Table 4

Significant Materials or Industrial Activities	Description	Potential Pollutants	Risk
Waste Water Treatment Plant	-Oil/Water Separator covered -Wetwell- Possible overflow of treated clean water will go to the outfall line. -Chemical Storage Area- Spill/leak will flow into the trench drainage and will be pumped through the feed line leading to the DAF cell for treatment.	Oil & Grease, pH, BOD, Water Treatment Chemicals	Low *
Scows (general trash) Alley 1- WWTP	Potential spillage will flow directly into the wastewater drainage ditch for treatment. -Empty chemical drums will be cut into half before disposal. -Clean up is maintained everyday.	Oil & Grease, BOD, TSS	Low *
Ammonia Condenser and Receiver	-Ammonia Condenser and Receiver is covered. -Round the clock operators are monitoring the area regularly and trained responder in case of leakage or spill.	pH, BOD, Toxic Chemicals	Low *
Diesel Fuel tanks (2)	-Potential spillage during delivery; standby operator during delivery. -Possible for leakage of the tank, oil spill will flow into the wastewater drainage ditch.	Oil	Low
Boiler Stacks	-Stacks with cap - No pollutant residue present	Shoat, Oil, Fuel	Low
Trash Dumpster (general trash) Alley 1- WWTP	-Potential spillage will flow directly into the wastewater drainage ditch. -Everyday clean up.	OIL & Grease, BOD, TSS	Medium *

CAT Diesel Generator	-Double wall metal tank. -Potential spillage during delivery; standby operator during delivery.	Oil	Low
Retort Baskets	-Everyday maintenance of cleanliness in the area -Disposal of deteriorating or rusty basket is implemented.	Metal	Low
Oil Unloading Area	-Potential spillage during delivery; standby operator during delivery. -Inspection of all pipes and pumps for potential leak. -Daily pumping of water from the containment pit.	Oil &Grease	Low *
Transformer 1 –MIS Building	-Spills/leaks possible; flow through the waste water drainage ditch	Oil	Low *
Transformer 2 –Safety and Health Office	-Spills/leaks possible; flow through the waste water drainage ditch	Oil	Low *
Dumpster (general trash)	-Potential spillage will flow directly into the wastewater drainage ditch. -Everyday clean up.	Oil &Grease, BOD, TSS	Medium *
Auto Shop – oil in concrete	-Potential spills from the forklift machinery will flow directly into the wastewater drainage ditch. -Routine clean up are maintains everyday.	Oil & Grease	Low *
Dock Wharf- fish handling	-The process water from the west to east area of the dock wharf will flow directly into the wastewater drainage ditch. -Routine clean up are maintained everyday. -8-inch high berm located along the dock area to prevent process water from flowing directly into the bay area.	BOD, TSS, Oil & Grease, Metal	Low *
Roof Top Ammonia Line	-Welded insulated Pipe. -The possibility of a spill is minimal. -Trained operator will respond immediately in the event of leak from the ammonia line.	pH, BOD, Toxic Chemicals	Low

Legend:

* - All water will flow to waste water system water treatment plant.

SECTION IV

4.0 Measures and Controls

Measures and Controls. Each facility covered by this permit shall develop a description of storm water management controls appropriate for the facility, and implement such controls. The appropriateness and priorities of controls in a plan shall reflect identified potential sources of pollutants at the facility. The description of storm water management controls shall address the following minimum components, including a schedule for implementing such controls:

Controls for storm water management regarding the various pollution sources were described in the above section. In addition general best management practices, preventive maintenance, and spill prevention and response procedures, periodic inspections, and training are described in this section.

4.1 Good Housekeeping

Good Housekeeping- Good housekeeping requires the maintenance of areas that may contribute pollutants to storm water discharges in a clean, orderly manner.

As part of the Ongoing SWPPP, the Team will ensure that the following day to day good housekeeping practices are maintained at all times:

- **The U.S. Department of Agriculture requires food processing facilities to maintain a high degree of cleanliness; in compliance with this requirement the production department is doing the clean up of all the production area after last production of the day.**
- **Process wastewater inside and outside the facility is discharged into Wastewater drainage ditch for processing.**
- **Chemicals are stored in a safe, neat and orderly manner in all designated area for storage. Inspection of these chemicals is routinely done to prevent spills.**
- **Any spill is promptly removed. There is a minimum accumulation of liquid and solid chemicals on the ground or floor in a building. A spill response team has been established and trained to contain and clean up all spills of materials that may be hazardous or release pollutants to storm water.**

- **Proper disposal of empty drums is well maintained; cutting of all the drums in half before disposing is implemented to prevent any residual material and possible spill.**
- **Significant materials are stored indoors and under cover.**
- **Standard operating procedures have been established for:**
  - **Monitoring connection and equipment operations during delivery of bulk materials to prevent spills;**
  - **SPCC Plan is well maintained in this facility in accordance with the response and clean up procedure of any spill of hazardous chemicals.**
- **Periodic inspections of all the areas that have the possible potential to be a pollutant sources.**
- **Periodic dry and wet period inspections will be conducted to identify any threats to storm water quality with appropriate follow up to prevent release of pollutants.**
- **Training of team member for spill response and good housekeeping are done annually.**
- **Employees are encouraged to maintain interest in good housekeeping**

4.2 Preventive Maintenance

Preventive Maintenance- a preventive maintenance program shall involve timely inspection and maintenance of storm water management devices (e.g., cleaning oil/ water separators, catch basins) as well as inspecting and testing facility equipment and systems to uncover conditions that could cause breakdowns or failures resulting in discharges pollutants to surface waters, and ensuring appropriate maintenance of such equipment and systems.

The plant also conducts the following detail inspections of the storm water management devices that requires periodic inspection and maintenance:

- **Monthly inspections of all the pipes and tanks for leakage and deterioration.**
- **Routine inspection and clean up of all the equipment, drains, sump pit and the area in the wastewater treatment plant.**
- **Inspections of roof top equipment such as gutters, drains and downspout pipes are being done routinely.**
- **Storage and servicing of other plant equipment including forklifts and batteries indoors.**

4.3 Spill Prevention, Response, and Reporting

Spill Prevention and Response Procedures- Areas where potential spills that can contribute pollutants to storm water discharges can occur, and their accompanying drainage points shall be identified clearly in the storm water pollution prevention plan. Areas that must be identified should include loading/unloading stations, outdoor storage areas, and waste management areas exposed to storm water. Where appropriate, specifying material handling procedures, storage requirements, and use of equipment such as diversion valves in the plan should be considered. Procedures for cleaning up spills shall be identified in the plan and made available to the appropriate personnel. The necessary equipment to implement a clean up should be available to personnel.

Pursuant to the requirements of the Oil Pollution Prevention Act and 40 CFR Part 112, a Spill Prevention Control and Countermeasure Plan has been developed for the facility. The plan describes in detail practices and procedures to be used to prevent and respond to spills of any hazardous materials and chemicals. Spill Prevention Control and Countermeasure Plan is available in the Engineering Department.

Star-Kist Samoa does not meet the eligibility requirements of Section 112(r) of the Clean Air Act. The facility has developed and implemented an Ammonia Management Program, however, to manage potential hazards of the ammonia refrigeration system.

Spill Response Team

A Spill response team has been organized and trained. Team members listed in Table #5.

Table 5

Name	Department	Position
Phil Thirkell	Overall	Plant Manager
Lance Ihaka	Engineering	Maintenance Manager
Joe Carney	Engineering	Utilities Department Head
Sonny Thompson	Safety and Health	Safety and Health Manager
Eric Johansson	Engineering	Utilities Supervisor
Compressor & WWTP Operators	Engineering	Operators/Responder
Safety Champion	All Department	Responder

All trained Hazardous Materials Technicians are the responsible team members to provide initial response and assessment of spills. Depending on the type of materials and associated hazard the spill response team will call for assistance from local emergency response teams.

Potential Spill Areas

The most probable locations where spills may occur are located in the following areas: all the chemical storage areas, all the possible areas that potential pollutants are available, and nearly anywhere on site. Response procedures are clearly defined. Response equipment and supplies are maintained readily available on hand. Generally spills are contained and cleaned up as quickly as possible, but with due consideration for safety of response personnel.

Materials Handling Procedures

Most Chemicals and materials brought into the facility are unloaded using forklift trucks. The operators exercise skill and care when handling such materials; they are trained and will undergo appropriate testing before they will be given the task to be a forklift driver. Delivery trucks are always backed up flush to the loading dock for safe access.

Storage Requirements

All the chemicals and most of the materials in use are stored inside the plant. Materials that are stored outside are kept covered.

Clean up Equipment and Procedure

Clean up equipment and absorbent materials are kept in the stockroom. In the event of a spill, the personnel will follow the manufacturer's guidelines on spill clean up.

Record Keeping and Reporting of Spill

Records of spills through formal reports are maintained for internal review at the Engineering Department by plant management and coordination with the EPA. Government and Environmental Agencies are notified immediately if a spill reaches the Pago Pago Harbor. Under CERCLA the release into the environment of more than a listed reportable quantity (RQ) of certain hazardous chemicals within a 24-hour period must also be reported immediately to the National Response Center. The center can be reached at:

*** National Response Center Hotline 800-424-8802**

The following hazardous chemicals from the CERCLA list are used at this facility in sufficient quantities that a spill could possibly exceed the reportable quantity as listed in Table 6:

Table 6

Hazardous Substance	Reportable Quantity (Pounds)
Anhydrous Ammonia	100
Chlorine	10
Oil	Spill into navigable waters

The following information must be provided when reporting a spill:

1. **Name, address and telephone number of person reporting;**
2. **Name, address and telephone number of person responsible for the discharge or release, if known;**
3. **Date and time of the discharge or release;**
4. **Type or name of substance discharged or released;**
5. **Estimated amount of the discharge of release;**
6. **Location or address of discharge or release;**
7. **Source and cause of the discharge or release;**
8. **Size and characteristics of area affected by the discharge or release;**
9. **Containment and clean up actions taken to date;**
10. **Other persons or agencies contacted;**
11. **Corrective action taken.**

In the event of emergencies related to chemical spills, the following persons are to be notified:

- **Star-Kist Samoa Officials:**

Phil Thirkell	**General Manager**
Lance Ihaka	**Maintenance Manager**
Joe Carney	**Utilities Department Head**
Sonny Thompson	**Safety and Health**

- **Government Officials:**

  Ms. Sheila Weigman **ASEPA, Program Adviser**
  Mr. Peter Peshut **Manager, Technical Service Program**

- **For corporate assistance or advice regarding spill response procedures contact:**

  John Brown **(208) 383-6557**

4.4 Inspection

Inspections- In addition to the comprehensive site evaluation required under Part XI.U.3.a (4) of this section, qualified facility personnel shall be identified to inspect designated equipment and areas of the facility. At a minimum, the following areas, where the potential for exposure to storm water exists, must be inspected on a regularly scheduled basis: loading and unloading areas for all significant materials; storage areas, including associated containment area; waste management units; vents and stack emanating from industrial activities; spoiled product and broken product container holding area; animal holding pens; staging areas; and air pollution control equipment. A set of tracking or follow-up procedures shall be used to ensure that appropriate actions are taken in response to the inspections. Records of inspections shall be maintained. Based on the results of the inspection, the description of potential pollutant sources and pollution prevention measures and controls identified in the plan shall be revised as appropriate with 2 weeks of such inspection and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than 12 weeks after the inspection.

A formal site inspection shall be conducted annually by a member of the Storm Water Pollution Prevention Team to verify that the descriptions of potential pollutant sources are accurate. Records documenting significant observations made during the annual site inspection and corrective actions resulting from the inspection will be retained as part of the SWPPP.

Aside from the Annual site inspection, potential sources of storm water pollution will be inspected periodically according to the schedule in Table 7.

Table 7

AREA	RESPONSIBLE DEPARTMENT	FREQUENCY
Waste Water Treatment Plant	Utilities Department	Daily
Scows (General Trash) WWTP	Sanitation Department	Daily
Ammonia Condenser and Receiver	Utilities Department	Daily
Diesel Fuel Tanks (2)	Auto Shop Department	Weekly
Trash Dumpster (General Trash) WWTP	Sanitation Department	Daily
Boiler Stacks	Utilities Department	Monthly
CAT Diesel Generator	Auto Shop Department	Weekly
Retort Basket	Retort Department	Daily
Oil Unloading Area	Utilities Department	Daily
Transformer 1- MIS Building	Electrical Department	Monthly
Transformer 2- Safety and Health Office	Electrical Department	Monthly
Dumpster (General Trash)	Sanitation Department	Daily
Auto Shop- oil in concrete	Auto Shop Department	Daily
Dock Wharf- Fish handling	East Side- Production Department West Side-Fleet Department	Daily
Roof Top Ammonia Line	Utilities Department	Monthly

Designated departments are responsible in maintaining the good housekeeping in areas, which potential sources of storm water pollution might occur. In the event that a major pollutant source is noticed in the inspection, the team member will notify immediately his Department supervisor about the incident. The supervisor will notify team leader and the spill prevention team and immediate response will be taken.

4.5 Training

Employee Training- Employee training programs shall inform personnel responsible for implementing activities identified in the storm water pollution prevention plan or otherwise responsible for storm water management at all levels of responsibility of the components and goals of the storm water pollution prevention plan. Training should address topics such as spill response, good housekeeping, material management practices, unloading/loading practices, outdoor storage areas, waste management practices, pest control, and improper connections to the storm sewer. At a minimum, this training must be provided annually. The pollution prevention plan shall identify frequencies and approximate dates for such training.

Members of the storm water pollution prevention team and other key helpers will be trained at least annually. New members of the team will receive orientation upon assignment to the team. Generally the training will involve:

- **Review and updating of the pollution prevention plan.**
- **Formal presentation of storm water pollution prevention principles and practices which may include:**
  - **Pollution control laws and regulations**
  - **Good housekeeping and materials management practices**
  - **Preventative maintenance of equipment and structures that may effect storm water quality**
  - **Inspection and reporting procedures including visual recognition of storm water pollution indicators**
  - **Pollution prevention measures**
- **Periodic training and certification of spill response team members**
- **The training format may involve a video to demonstrate storm water pollution prevention practices and procedures**

All Training attendance records will be documented in the SWPPP records.

4.6 Record Keeping and Internal Reporting

Record keeping and Internal Reporting Procedures- A description of incidents (such as spills, or other discharges), along with other information describing the quality and quantity of storm water discharges shall be included in the plan required under this part. Inspections and maintenance activities shall be documented and records of such activities shall be incorporated into the plan. Ineffective BMP's must be recorded and the date of their corrective actions noted in the plan.

All records pertaining documentation of the inspection and maintenance activities, evaluation and correction of BMP's related to the storm water pollution prevention plan will be retained in a master file maintained by the EPA Specialist in the Engineering Office.

4.7 Sediment and Erosion Control

Sediment and Erosion Control- The plan shall identify areas which, due to topography, activities, or other factors, have a high potential for significant soil erosion, and identify structural, vegetation, and /or stabilization measures to be used to limits erosion.

There are no areas in the facility, which can be highly susceptible for erosion, except the Tank Farm, which has a small-elevated area that vegetation is maintained. In the event soil must be exposed for either routine maintenance or construction that erosion might be possible, appropriate measures will be take to prevent erosion and discharge of sediment in the storm water outfall. The following BMP's will be applied to the area:

1. **Minimize the exposure of disturbed area.**
2. **Divert drainage from the adjacent areas.**
3. **Use swales, barriers, and netting to capture sediment.**

4.8 Management of Runoff

Management of Runoff- the plan shall contain a narrative consideration of the appropriate of traditional storm water management practices (practices other than those which control the generation or source(s) of pollutants) used to divert, infiltrate, reuse, or otherwise manage storm water runoff in a manner that reduces pollutants in storm water discharges from the site. The plan shall provide that measures that the permittee determines to be reasonable and appropriate shall be implemented and maintained. The potential various sources at the facility to contribute pollutants to storm water discharges associated with industrial activity [see Parts 4.2.4 and 6.U.4 of the MSGPfor descriptions of potential pollutant sources] shall be considered when determining reasonable and appropriate measures. Appropriate measures or equivalent measures may include: vegetative swales and practices, reuse of collected storm water (such as for a process or as irrigation sources), inlet controls (such as oil/water separators), snow management activities, infiltration devices, and wet detention/retention devices.

During 1992 and in anticipation of the storm water general permit, Star-Kist Samoa, Inc. undertook some major structural modification to ensure that the process water does not come into contact with the storm water. New gutters for rainwater have been installed along the roofs throughout the plant. All the gutters are connected to the sealed downspouts that will flow directly into the outfall. Maintenance of Roof Gutters is being done by the General Maintenance Department. In the event of excess rainfall an overflow will go directly into wastewater drainage ditch along the East to the West side of the Dock area and the 8-inch berm is use to block the water from flowing directly into the bay. The waste drainage ditch is adjacent to the sump pit that will pump directly into the wastewater treatment plant for treatment. The treated clean water from the wet well after process in the wastewater treatment plant will go to the outfall line and be discharged under the facility's NPDES permit.

4.9 Non-storm water Discharges and Certification

All discharges authorized by the MSGP shall be composed entirely of storm water. According to Parts 1.2.2.2 and 6.U.3.1 of the MSGP, discharges of non-storm water including boiler blowdown, cooling tower overflow and blowdown, ammonia refrigeration purging, and vehicle washing/clean-out operations are specifically prohibited. However, certain non-storm water discharges, which are listed below, are authorized under the permit.

4.9.1 Non- Storm Water Certification

The plan shall include a certification that the discharge has been tested or evaluated for the presence of non-storm water discharges. The certification shall include the identification of potential significant sources of non-storm water at the site, a description of the results of the test and/or evaluation for the presence of non-storm water discharge, the evaluation criteria or testing method used, the date of any testing and/or evaluation, and the onsite drainage points that were directly observed during the test. Certifications shall be signed in accordance with Part 9.7 of this permit. Such certifications may not be feasible if the facility operating the storm water discharge associated with industrial activity does not have access to an outfall, manhole, or other point of access to the ultimate conduit which receives the discharge. In such cases, the source identification section of the storm water pollution prevention plan shall indicate why the certification required by this part was not feasible, along with the identification of potential significant sources of non-storm water at the site. A discharge that is unable to provide the certification required by this paragraph must notify the director in accordance with Part 4.4.1.3 of this permit.

4.9.2 Authorized Non-Storm Water Discharges

(ii) Except for flows from fire fighting activities, sources of non-storm water listed in Part 1.2.2.2 (Allowable Non-storm Water Discharges) of this permit that are combined with storm water discharges associated with industrial activity must be identified in the plan. The plan shall identify and ensure the implementation of appropriate pollution prevention measures for the non-storm water component(s) of the discharge.

The facility at present has only Air Conditioning Condensate as non-storm water discharges in compliance with the SWPPP and applicable monitoring requirements. A small quantity of condensate from compressor and air

conditioners is discharged directly into the roof gutters and it will drain into the sealed downspouts that are connected into the outffalls.

4.9.3 Failure to Certify

Any facility is unable to provide the certification required (testing for non-storm water discharges), must notify the Director 180 days after submitting an NOI to be covered by this permit. If the failure to certify is caused by the inability to perform adequate tests or evaluations, such notification shall describe: the procedure of any tests conducted for the presence of non-storm water discharges; the results of such test or other relevant observation; potential sources of non-storm water discharges to the storm sewer; and why adequate tests for such storm sewers were not feasible. Non-storm water discharges to waters of the United States that are not authorized by an NPDES permit are unlawful and must be terminated.

Other than the above referenced authorized discharge of non-storm water there are no other unauthorized discharge from the facility.

5.0 Comprehensive Site Compliance Evaluation

Comprehensive Site Compliance Evaluation. Qualified personnel shall conduct site compliance evaluations at appropriate intervals specified in the plan, but in no case less than once a year. Where compliance evaluation schedules overlap with inspections required under Part 4.2.7.2.1.5 of this section, the compliance evaluation may be conducted in place of one such inspection. Such evaluations shall provide:

5.1 Inspection

Areas contributing to a storm water discharge associated with industrial activity shall be visually inspected for evidence of, or the potential for, pollutants entering the drainage system. Measures to reduce pollutant loading shall be evaluated to determine whether they are adequate and properly implemented in accordance with the terms of the permit or whether additional control measures are needed. Structural storm water management measure, sediment and erosion control measures, and other structural pollution prevention measures identified in the plan shall be observed to ensure that they are operating correctly. A visual inspection of equipment needed to implement the plan, such as spill response equipment, shall be made.

Once a year a comprehensive site compliance evaluation (CSCE) will be conducted. This frequency is considered sufficient for this site to ensure an appropriate level of storm water pollution prevention. During the evaluation the site will be inspected and all the elements of the storm water pollution prevention plan will be reviewed. A checklist to guide the CSCE is formulated.

5.2 Plan Update

Based on the results of the evaluation, the description of potential pollutant sources identified in the plan in accordance with Part 4.2.4 and 6.U.4.2 (description of Potential Pollutant Sources) of this permit and pollution prevention measures and controls identified in the plan in accordance with paragraph 4.2.7 (Measures and Controls) of this permit shall be revised as appropriate within 2 weeks of such inspection and shall provide for implementation of any changes to the plan in a timely manner, but in no case more than 12 weeks after the inspection.

The SWPP Team will review the findings of the comprehensive site evaluation and update the plan as appropriate to enhance pollution prevention measures and controls within the required time frame.

5.3 Comprehensive Site Evaluation Report

A report summarizing the scope of evaluation, personnel making the evaluation, the date(s) of the evaluation, major observation relating to implementation of the storm water pollution prevention plan, and actions taken in accordance with Part 4.9.4 of the permit shall be made and retained as part of the storm water pollution prevention plan for at least 3 years from the date of the evaluation. The report shall identify any incidents of noncompliance; the report shall contain a certification that the facility is in compliance with the storm water pollution prevention plan and this permit. The report shall be signed in accordance with Part 9.7 (Signatory Requirements) of this permit.

The comprehensive site evaluation will be conducted according to the checklist. The following information will be included in the summary report:

- **Date of the evaluation**
- **Scope of the evaluation**
- **Persons participating in the evaluation**
- **Summary of major observations**
- **Evidence of un-authorized non-storm water discharge**
- **Review of monitoring records for the past year**
- **Incident of non-compliance**
- **Corrective actions taken**
- **If appropriate, a certification of compliance**
- **Appropriate signature.**

After thorough evaluation of the CSCE report, it will be distributed to the SWPPP team for follow-up and implementation of the corrective actions. The latest CSCE will be the guide for the following site inspection, if the implementation and the corrective action were being done.

5.4 Scope of Comprehensive Site Evaluation

The storm water pollution prevention plan must describe the scope and content of the comprehensive site evaluation that qualified personnel will conduct to (1) confirm the accuracy of the description of potential source contained in the plan, (2) determine the effectiveness of the plan, and (3) assess compliance with the terms and conditions of the permit. The individual or individuals who will conduct the evaluations must be identified in the plan and should be members of the pollution prevention team as identified in Part 4.2.1 (Pollution Prevention Team) of this permit.

The Comprehensive Site Compliance Evaluation (CSCE) will be conducted by at least two members of the storm water team, consist of EPA Specialist and the Supervisor of the Utilities Department. Team members conducting the audit must have received the formal annual storm water training. If possible the corporate environmental engineer will participate in the audit.

The CSCE will encompass all elements of the SWPPP as outlined in the CSCE checklist in Appendix E and will be relevant to the following concerns:

- **Confirm the accuracy of the facility description contained in the SWPPP**
- **Determine the effectiveness of the plan**
- **Assess compliance with the terms and conditions of the permit.**

6.0 Numeric Effluent Limitations

There are no additional numeric effluent limitations beyond those described in Part 5 of this permit.

This facility is not required to conduct any laboratory analysis of storm water under the MSGP, so no effluent limits specific to this facility and no sampling data is available.

7.0 Monitoring and Reporting

This facility is not required in either category of facilities to sample and test storm water under Sector U of the MSGP. Therefore no analytical test will be conducted on storm water samples. Since no analytical testing is required for storm water samples, no monitoring reports need to be submitted, however Quarterly Visual Examination of Runoff Quality is required to be performed by a trained qualified team member, the result of this test is not required to be submitted but it will be maintained in the master file in the Engineering Department to be available in terms of evaluation of the facilities storm water pollution prevention plan.

7.1 Procedure for Visual Examination of Runoff Quality

Examination shall be made of a grab sample collected within the first 30 minutes (or as soon thereafter as practical, but not to exceed 1 hour) of when the runoff begins discharging. The examinations shall document observations of color, odor, clarity, floating solids, settled solids, suspended solids, foams, oil sheen, and other obvious indicators of storm water pollution. The examination must be conducted in a well-lit area. No analytical test is required to be performed on the samples. All such samples shall be collected from the discharge resulting from a storm event that is greater than 0.1 inches in magnitude and that occurs at least 72 hours from the previously measurable (greater than 0.1 inch rainfalls) storm event. Where practicable, the same individual should carry out the collection and examination of discharges for entire permit area.

The facility has eight (8) outfalls that discharge storm water directly into Pago Pago Bay; all the outfalls and sources pollution area are described in Section 3.1 in this plan in more detail. During visual examination of storm water quality, only one of the outfalls with the same flow location will be sampled as representative of all the outfalls. Collection of samples for quarterly visual examination will be done in the various locations describe below:

- **Both outfalls #2 and #3 can be impacted by industrial activity and will be sampled for visual inspection. Collection of samples in Outfall #3 will be done in the catch basin grating located in the main highway. All the rainfalls from the north area of the facility s covered under this sampling location.**
- **Outfalls #3, #4, #5, #6, #7 will be impacted together because all the outfalls have substantially identical flow. Collection of samples will be done in outfall #5 in an open downspout pipe, this samples consist of all the runoff drains from the roofing of the facility.**
- **Outfall #8 will be the third sample area located in the Alley 1. The same procedure of collection will be done; collection of samples will be done in the open grating located behind the retort area.**

The checklist that was formulated for physical examination of runoff is included in Appendix F. The members of the team, which consist of Wastewater operator and the Wastewater hourly supervisor, will perform the task. A grab sample from each outfall will be collected in a clean beaker. The samples will be representative of the water from the outfalls. The Wastewater laboratory technician will inspect the collected water.

Each sample will be examined in a well-illuminated area. The sample will be inspected for the presence of each of the following indicators of storm water pollution.

- **Odor**
- **Color**
- **Clarity**
- **Floating solids**
- **Settle Solids**
- **Suspended solids**
- **Foam**
- **Oil sheen**

Before sampling the responsible person will consider recent and current rainfall events. A sample of runoff for a visual inspection will be taken only under the following conditions:

- **The time since the last measurable rainfall event exceeds 72 hours;**
- **The rainfall from the sampled storm events exceeds 0.1 inches**
- **The sample is collected within 30 minutes of when runoff commences.**

If the sample indicates the presence of pollutant, the sampler will survey the drainage area to determine the source of the pollutants. If possible the source of pollutants should be removed or eliminated.

The examination checklist will be completed to document the findings and any actions taken to reduce or eliminate pollutants. The report will be filed with records related to the pollution prevention plan. The report shall include the examination date and time.

7.2 Quarterly Visual Examination of Runoff Quality

Quarterly Visual Examination of Storm Water Quality. Facility shall perform and document a visual examination of a storm water discharge associated with industrial activity from each outfall, except discharges exempted below. The examination(s) must be made at least once in each of the following 3 months periods January through March, April through June, July through September, and October through December. The examination shall be made during daylight hours unless there is insufficient rainfall or snowmelt to produce a runoff event.

- **January-March**
- **April-June**
- **July-September**
- **October-December**

The visual examination will be made during daylight hours if there is sufficient rainfall to produce a runoff event. If there is insufficient rainfall during daylight hours the sample will be collected after dark, but only if there is no risk to the safety of the sampler. If no visual examination is possible during any particular quarter due to any circumstances or unsafe condition, the inspector will document the reasons.

7.3 Visual Examination Documentation

Visual examination reports must be maintained on site in the pollution prevention plan. The report shall include the examination date and time, examination personnel, the nature of the discharge (including observations of color, odor, clarity, floating solids, settled solids, suspended solid, foam, oil sheen, and other obvious indicator of storm water pollution) and probable sources of any observed storm water contamination.

All the documented visual examination every quarter will be reported to the Team leader and then EPA Specialist will file it in the Engineering Office.

7.4 Multiple Outfalls

When a facility has two or more outfalls that, based on a consideration of industrial activity, significant materials, and management practices and activities within the area drained by the outfall, the permittee reasonably believes discharge substantially identical effluents, the permittee may collect a sample of effluent of one of such outfalls and report that the examination data also applies to the substantially identical outfall(s) provided that the permittee includes in the storm water pollution prevention plan a description of the location of the outfalls and explains in detail why the outfalls are expected to discharge substantially identical effluent. In addition for each outfall that the permittee believes is representative, an estimate of the size of the drainage area (under 40 percent), medium (40 to 65 percent), or high (above 65 percent) shall be provided in the plan.

The facility has eight (8) outfalls that discharge storm water directly to Pago Pago Bay. All the runoff will drain into the gutters and sealed downspout are constructed in different areas. Section 3 in this plan explains each outfall in detail. Outfall #2 and #3 will be impacted into one sample area, which is outfall #3 grating drainage along the high way. Outfalls #1, #4, #5, #6, #7 will be impacted and only one sample will be collected in outfall #5. Outfall #8 sample will be done in an open grating behind retort area.

8.0 Storm Water Pollution Prevention Plan Certification

Signature/Location. The plan shall be signed in accordance with Part 9.7 (Signatory Requirements), and be retained onsite at the facility that generates the storm water discharge in accordance with Part 8 (Retention of Records) of this permit. For inactive facilities, the plan may be kept at the nearest office of the permittee.

Per the requirements of U.S. Environmental Protection Agency Multi-Sectoral General Permit, Sector U, I am the authorized representative responsible for compliance of this facility under this storm water permit. I certify under penalty of the law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information submitted. The information to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Representative:

Mr. Phil Thirkell
Plant Manager
Star-Kist Samoa, Inc.

Signature

4/5/01
Date

STAR-KIST SAMOA, INC. **PAGO PAGO, AS**

STORM WATER POLLUTION PREVENTION PLAN
QUARTERLY VISUAL EXAMINATION OF STORM WATER DISCHARGE

Inspection Period: _____ Jan-Mar _____ Apr-Jun _____Jul-Sep _____ Oct-Dec
Date: _____ **Rainfall Start Time:** _____ **Time of Sample:** _____

Conditions for Inspection

- Storm event exceeds 0.1 inches of precipitation
- At least 72 hours since the previous storm event (exceeding 0.1 inches)
- Sample within the first 30 minutes (but not to exceed 1 hour) of runoff commencing
- Lighting is adequate for visual inspection
- Grab Sample

Observations—Examine Samples For

_____ Color	____ Odor	____ Clarity
_____ Floating Solids	____ Suspended Solids	____ Settled Solids
_____ Foam	____ Oil Sheen	

Response Required

_____ For each visual indication of pollutant identify and eliminate probable sources.
_____ Complete this form and retain in SWPPP compliance file.

OUTFALL	OBSERVATION	CORRECTIVE ACTION
002 & 003		
001, 004, 005,006 & 007		
008		

If no quarterly inspection is possible, document reasons:

_____
_____
_____

Inspector: _____ _____
Name Signature

Star-Kist Samoa, Inc. Pago Pago, American Samoa

STORM WATER POLLUTION PREVENTION PLAN
ANNUAL COMPREHENSIVE SITE COMPLIANCE EVALUATION

Date of Inspection: _____

Participant: _____

Area of Inspection	Standard and/or Control Procedures	Observations and Recommendations	Date of Correction
All outside areas and roofs	General good housekeeping is practice		
Access roads and receiving areas	- Spills of waste materials are clean up. - Spills of oil and fuel are cleaned up or not evident		
Dumpster Areas	Debris and spillage are cleaned up.		
Empty drums	-Cleaned up the area -Cut into half before disposal		
Chemical storage	-No visible evidence of spills and leaks -Spills and leaks are cleaned up -Covered properly -Stored in orderly manner with pallet -Protected with secondary containment		
Ammonia	-Any contaminated water is routed to the process drain		
Ammonia Filling	-No leaks occur while filling ammonia		
Auto shop	-Cleaned up spillage		

Area of Inspection	**Standard and/or Control procedures**	**Observations and Recommendations**	**Date of Correction**
Freezer condensate	**-Condensate is free of visible pollutants**		
Bulk chemical delivery	**-Care is taken not to spill materials**		
Oil unloading area	**-Spillage of oil is prevented -Secondary containment will be check of water and debris -Spillage of oil is cleaned up**		
Oil/Water Separator	**-Spillage is cleaned up**		
Roof Drains and gutters	**-Runoff from the roof drains does not contact exposed materials -Cleaned up the gutters**		
Parking lot	**-Trash and debris is regularly removed**		
Exposed soil	**-Erosion is not occurring**		
	-Barriers are in place to capture eroded materials		
Storm water catch basins and drains	**-There is no visible debris or trash**		
Pallets	**-Exposed are clean**		
Boiler Stacks	**-No evidence or accumulation of pollutant**		
Retort Baskets	**-Cleaned up the area**		
Tank Farm	**-Cleaned up the area -Spillage of oil is prevented**		
Dock area Fish unloading and handling	**-Cleaned up in the area is maintained**		

Area of Inspection	**Standard and/or Control Procedures**	**Observations and Recommendations**	**Date of Correction**
Drainage ditch	**-No visible evidence of debris that will block the flow -Cleaned up of the area is maintain**		
Waste water treatment plant	**-Cleaned up in the area is maintained**		

SIGNATURES

Principal Inspector:

_____
Name

_____
Signature

_____
Date

Secondary Inspector:

_____
Name

_____
Signature

_____
Date

CSCE CERTIFICATION

Per the requirements of U.S. Environmental Protection Agency Multi-Sector General Permit, Sector U, I am the authorized representative responsible for compliance of this facility under this storm water permit. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assume that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Representative:

L. A. THIRKELL.

Name

Signature

4/5/01.

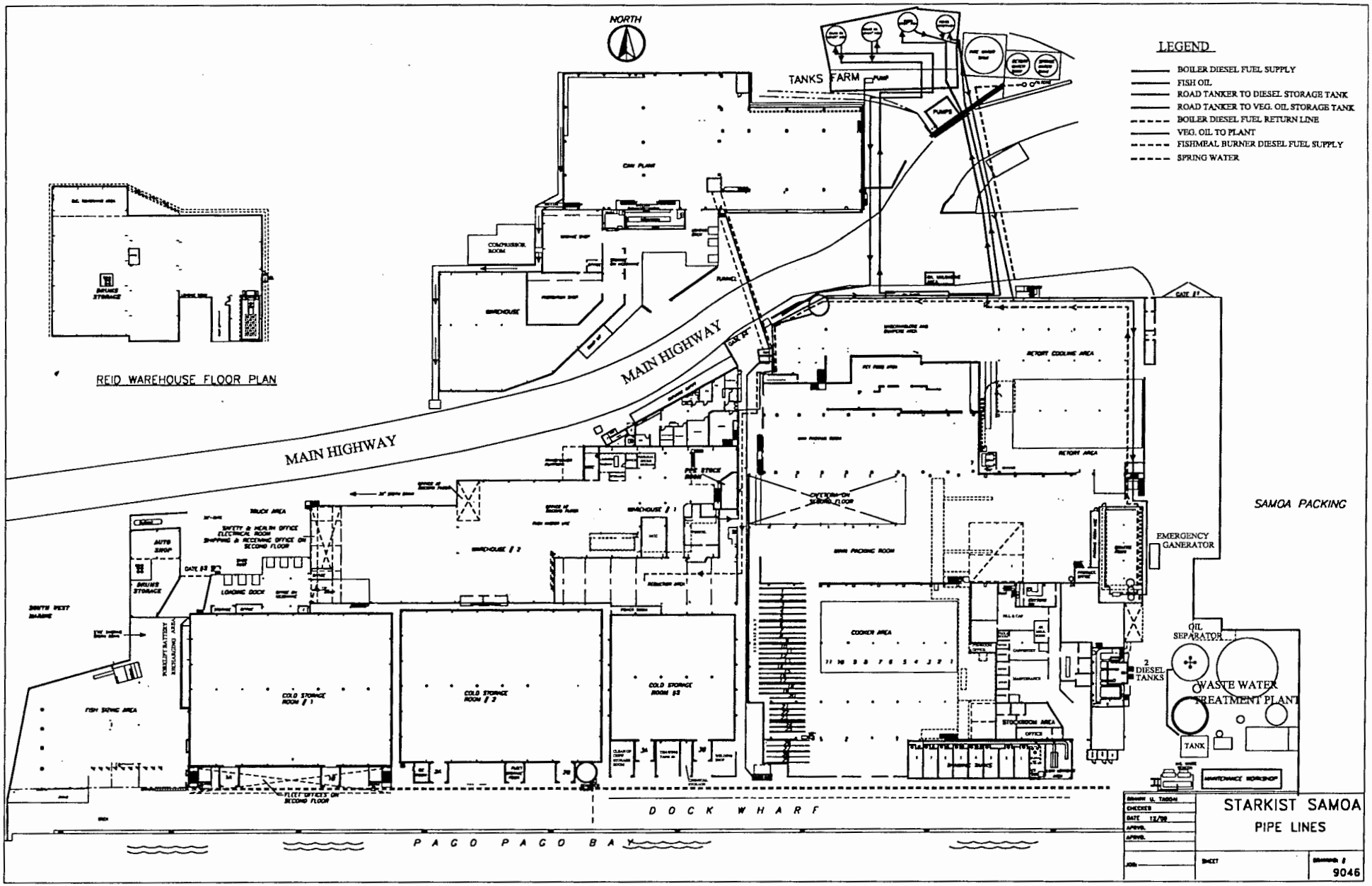
Date

STAR-KIST SAMOA, INC.

SPILL PREVENTION CONTROL AND COUNTERMEASURES PLAN

REVISED
DECEMBER, 2000

Star-Kist Samoa, Inc.
P.O Box 368
Pago Pago AS. 96799
Phone: (684) 644-4231


NORTH
TANKS FARM
LEGEND
BOILER DIESEL FUEL SUPPLY
FISH OIL
ROAD TANKER TO DIESEL STORAGE TANK
ROAD TANKER TO VEG. OIL STORAGE TANK
BOILER DIESEL FUEL RETURN LINE
VEG. OIL TO PLANT
FISHMEAL BURNER DIESEL FUEL SUPPLY
SPRING WATER
REID WAREHOUSE FLOOR PLAN
MAIN HIGHWAY
MAIN HIGHWAY
SAMOA PACKING
EMERGENCY GENERATOR
OIL SEPARATOR
2 DIESEL TANKS
WASTE WATER TREATMENT PLANT
TANK
MAINTENANCE WORKSHOP
COLD STORAGE ROOM # 1
COLD STORAGE ROOM # 2
COLD STORAGE ROOM #3
COOKER AREA
RETORT AREA
RETORT COOLING AREA
WAREHOUSE # 1
WAREHOUSE # 2
TRUCK AREA
LOADING DOCK
AUTO SHOP
DRUMS STORAGE
FISH SKINS AREA
FLEET OFFICES ON SECOND FLOOR
D O C K W H A R F
P A G O P A G O B A Y
STARKIST SAMOA
PIPE LINES
9046

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SPILL PREVENTION CONTROL AND COUNTERMEASURE PLAN

FOR

STAR-KIST SAMOA, INC.
BOX 368
ATU'U PAGO-PAGO
AMERICAN SAMOA, 96799

Original Date of Plan: November 3,1979
Date of Last Plan Amendment/P.E Certification: April 30,1995
Date of Last Plan Review: December 12,2000

Designated Person Accountable for Spill Prevention

Phil Thirkell
General Manager

CERTIFICATION

I hereby certify that I have examined the facility and being familiar with the provision of 40 CFR part 112, attest that this SPCC Plan has been prepared in accordance with good engineering practices.

Engineer : John J. Brown, P.E

Title : General Manager
Technology and Regulatory Affairs
H.J. Heinz Company
World Headquarters

Signature :

Registration Number: E 4911

State : Idaho

Date : December 12,2000

REGISTERED PROFESSIONAL ENGINEER 4911 STATE OF IDAHO JOHN J. BROWN

ORIGINAL

INTRODUCTION

The following Spill Prevention Control and Countermeasure Plan (SPCC) is prepared by Star-Kist Samoa, Inc. in compliance with Title 40 CFR, part 112.

The original Spill Prevention Control and countermeasure Plan (SPCC) was prepared on November 3,1979. Due to various modifications adjacent to the plant, which interfered with truck unloading containment berms, this SPCC Plan was updated and reviewed by Norman Wei, a Registered Professional Engineer, on April 30, 1995. The current Revisions were made to reflect Management Changes at Star-Kist Samoa, and have been reviewed by a Registered Professional Engineer.

SPILL PREVENTION CONTROL AND COUNTERMEASURE COMPLIANCE INSPECTION PLAN REVIEW PAGE

In accordance with CFR 40 112.5(b), a review and evaluation of this SPCC Plan is conducted at least once every three years. As a result of this review and evaluation, Star-Kist Samoa, Inc. will amend the SPCC Plan within six months of the review to include more effective prevention and control technology if: (1) such technology will significantly reduce the likelihood of a spill event from the facility, and (2) if such technology has been field-proven at the time of review. Any amendment to the SPCC Plan shall be certified by a Professional Engineer within six months after a change in the facility design, construction, operation, or maintenance occurs which materially affects the facility's potential for the discharge of oil into or upon the navigable waters of the United States or adjoining shorelines.

REVIEW DATES	SIGNATURE:
1. April, 1995 *	Barry Mills
2. February, 1997	Barry Mills
3. December, 2000 *	Phil Thirkell

* SPCC Plan amended and certified by a Registered Professional Engineer per 40 CFR 112.3(d).

The individual appointed to be responsible and in charge of SPCC Plan

Name : Lance Ihaka

Title : Manager, Maintenance and Engineering
Star-Kist Samoa, Inc.

Signature: _____

Date : December 12, 2000

MANAGEMENT APPROVAL

Star-Kist Samoa, Inc. is committed to conduct its business in an efficient manner, and maintains its operations in an environmentally safe manner by complying with applicable environmental regulations for Spill Prevention Control and Countermeasures through regular review, updating, and implementation of this plan.

Name : Phil Thirkell

Title : General Manager
Star-Kist Samoa, Inc.

Signature: _____

Date : December 12,2000

1. FACILITY OWNER AND OPERATOR

A. Facility Owner, Address and Telephone:

Star-Kist Samoa, Inc.
P.O Box 368
Atu'u Pago Pago
American Samoa, 96799
(684) 644-4231

B. Facility Operator, Address and Telephone:

Star-Kist Samoa, Inc.
P.O Box 368
Atu'u Pago Pago
American Samoa, 96799
(684) 644-4231

2. FACILITY CONTACT(S):

	NAME		TELEPHONE
2.1	Phil Thirkell/Business/General Manager	Business	(684) 644-4231 Ext. 311/327
	On Scene Commander	Cellular	258-4211
		Home	(684) 644-1324

Designated Person(s) in Charge (DPIC)

	NAME		TELEPHONE
2.2	Lance Ihaka/Manager Engineering	Business	(684) 644-4231 Ext. 362
	Emergency Response Coordinator	Cellular	258-3234
		Home	(684) 699-4410
2.3	Sonny Thompson/Safety & Health Mngr.	Business	(684) 644-4231 Ext. 425
	Safety and Health Team Leader	Cellular	733-2384
		Home	(684) 644-1343
2.4	Joe Carney/Dept. Head, Utilities	Business	(684) 644-4231 Ext. 354
	Critical Operation Team Leader	Cellular	733-1819
		Home	(684) 699-4355
2.5	Ed Harmon/Dept. Head, Gen. Maintenance	Business	(684) 644-4231 Ext. 360
	Support Team Leader	Cellular	733-1086
		Home	(684) 699-2898
2.6	Ma. Theresa Pastorfide/EPA Specialist	Business	(684) 644-6431 Ext. 357
	Responder	Cellular	733-5170
		Home	(684) 699-5674

3. FACILITY LOCATION

Pago-Pago harbor, American Samoa
United States Possession
Longitude: W 170 degrees 41'15"
Latitude: S 14 degrees 16'28"

4. FACILITY DESCRIPTION

A. Facility Storage

Aboveground Storage Tanks:

TANK ID	VOLUME	CONTENTS	LOCATION
#1 Fuel Oil	42,300 gallons	Diesel	Tank Farm
#2 Fuel Oil	42,300 gallons	Diesel	Tank Farm
#3 Vegetable Oil	42,300 gallons	Soya Bean Oil	Tank Farm
#4 Vegetable Oil	42,300 gallons	Soya Bean Oil	Tank Farm
#5 Oil/Water Separator	595 gallons	Used Oil and Water	WWTP
#6 Emergency Generator Unit	1,200 gallons	Diesel	WWTP
#7 (2) Emergency Generator Fuel	100 gallons (each)	Diesel	WWTP

Drums and Containers:

15 Drums	55 gallons	Motor Oil	Auto Shop

5. SPILL HISTORY

5.0 SCOPE

a) **Date**
b) **Type**
c) **Rate and Direction of Flow**
d) **Volume Discharged**
e) **Corrective Action**
f) **Prevention Plan**

This facility experiences (3) three spill events in 1995. No spills have been experienced since that time.

1. **Issued by the US Coast Guard Tk. #00004223**

DATE:	February 2, 1995
TYPE:	OIL
RATE:	Approximately 20 gallons per minute
DIRECTION OF FLOW:	Pago-Pago Harbor
VOLUME DISCHARGE:	5 gallons
CORRECTIVE ACTION:	Installed dike around oil tank to contain potential overflow.
PREVENTIVE ACTION:	Improved operator monitoring/ concrete dike around tank.

2. **Issued by the US Coast Guard Case #MV 95005400**

DATE:	May 9, 1995
TYPE:	SOYA OIL
RATE:	< 5 gallons per minute
DIRECTION OF FLOW:	Pago-Pago Harbor
VOLUME DISCHARGE:	< 30 gallons
CORRECTIVE ACTION:	Replace faulty drainpipe.
PREVENTIVE ACTION:	Inspect condition of entire drain piping and make necessary repairs.

3. **Issued by the US Coast Guard Case #MVP 95005399**

DATE:	May 16,1995
TYPE:	SOYA OIL
RATE	Approximately 5 gallons per minute
DIRECTION OF FLOW:	Pago-Pago Harbor
VOLUME DISCHARGE:	< 40 US Gallons
CORRECTIVE ACTION:	Replace faulty section of drainpipe.
PREVENTIVE ACTION:	Inspect condition of entire drain piping and make necessary repairs.

5.1 PREDICTION OF POTENTIAL SPILLAGE DUE TO EQUIPMENT FAILURE

- Average Most Probable Discharge from the Facility (10 gallons)
- Maximum Most Probable Discharge from the Facility (3,750 gallons)
- Worst Discharge from the Facility (46,100 gallons)

Average most probable discharge scenario assumes a gasket leak or pipe fitting drip discovered during a routine check.

Maximum most probable discharge scenario assumes a tank overflow as a result of operator error. Allowing 15 minutes of undetected pumping at 250 gallons per minute rate, the result would be 3,750 gallons.

Worst case discharge scenario assumes a complete rupture of an entire tank and all contents being discharged.

I.	Soya Bean Oil	42,300 gallons
II.	Diesel Fuel	42,300 gallons

Therefore the worst case scenario, in the unlikely event of the delivery pump running undetected for 15 minutes and tank plus delivery-piping rupture, would be 46,100 gallons.

5.1 IDENTIFICATION OF TYPES OF FAILURES

Minor Failure:
Average most probable discharge scenario assumes a gasket leak or pipe fitting drip discovered during a routine check.

Major Failure:
Maximum most probable discharge scenario assumes a tank overflow as a result of operator error. Allowing 15 minutes of undetected pumping at 250 gallons per minute rate, the result would be 3,750 gallons.

Worst case discharge scenario assumes delivering product to the tank farm and the following takes place:

a. Tank and piping system rupture
b. Pumping continues undetected for 15 minutes

Therefore the worst case scenario, in the unlikely event of a tank and delivery piping system discharging their contents at the same time, would be 46,100 US gallon

5.3 DIRECTION

a) In the event of a major failure, the discharged product will be contained by the dike surrounding the storage tanks or with the berm and catch basin at the truck unloading area.
b) Used petroleum oil from the plant will be stored in 55 gallons drums with bungs capped for re-use as a fuel within the plant's boilers. A separate storage area located adjacent to the waste water treatment plant is utilized where the oil filtration equipment is located.
c) In case of an occurrence of a worst case scenario, part of the effluent could be discharged into Pago Pago Harbor.

5.4 RATE OF FLOW

a) The rate of flow would be determined by the type(s) of failure and the Volume of storage facility affected. A severe failure scenario would be a massive collapse of an entire storage tank(s).

5.5 TOTAL QUANTITY OF FLOW

In the event that a failure is not secured in time, The maximum total quantities would be as follows:

a) Tank Farm storage area: (2) 42,300 gallons Soya oil and (2) 42,300 gallons Fuel oil tanks.
b) Plant truck unloading area 2,000 gallons vegetable (Soya bean) oil tank or 4,000 gallons of fuel oil tank.
c) Self –contained emergency generator, 1,200 gallons diesel fuel.
d) Emergency generator, 2 tanks 100 gallons each diesel fuel.
e) Maximum volume of a used oil spill would be 55 gallons, resulting from a puncture or overturning. This quantity would flow into a secondary containment (catch basin) in the wastewater treatment area.

5.6 SECONDARY CONTAINMENT

a) Tank Farm Storage Area – The (2) 42,300 gallons vegetable oil tanks and (2) fuel oil tanks are contained within a common dike area, capable of containing 52,200 gallons. This represents slightly over 120% containment capabilities of the largest tank's contents.

b) Truck Unloading Area – a concrete berm 6' x 10' x 12' which drains into a 5,000 gallons sump with an oil separation baffle. This will hold 125% of the largest truck tank transferring at the berm.
c) Self-contained emergency generator uses a double-walled fuel tank, which provides sufficient containment capacity.
d) Emergency generator, two 100 gallon tanks for diesel fuel, no secondary containment, however any spill would be captured by drain and flow to waste water treatment.
e) Providing the volume of used oil that could be spilled in a single event is approximately 55 gallons, the entire volume will be contained within the plant drainage collection system and contained in the waste water treatment area, where it can be effectively cleaned and disposed. Bung caps will be kept in place so as to minimize the probability of a spill.
f) Refer to Appendix C for equipment list and records provided by Harbor Refuse and Environmental services under contract to respond concerning oil spill management.

6. APPLICABLE GUIDELINES AND REGULATIONS

6.0 DRAINAGE FROM DIKED STORAGE AREAS

The containment dike that surrounds the tank farm has a 4"line Connection, which is utilized as a pump line discharging water, collected in the dike. See sketch on Form G-1 labeled "Dike Storage Area" in Appendix G for a relative location of pump and piping system.

During inspection of containment area the EPA Specialist will check for water and signs of floatable debris, odor and/or oil sheen. Following are guidelines for dealing with the different scenarios that might be encountered during those inspections.

a) No water of debris in the containment area requires no action other than documentation on Form D-1 " Visual Inspection Report for Tank Farm Containment Area" in Appendix D.

b) Water level of 3" or more above pump sump requires close inspection for floatable, odors or oil sheen. If none of these are present then pumping of water to the WasteWater Treatment plant will be necessary. This will be accomplished by starting the containment pump and pumping the water down to the level of the pump sump or pump suction and documenting on Form D-2 "Water Removal Report from Dike Tank Farm Containment" in Appendix D.

c) Water level of 3" or more above pump sump and presence of debris but no oil sheen or odor requires skimming off and depositing in containers by the EPA Specialist. He/She has been trained on proper disposal methods for the debris. Remaining water can then be pumped to the WWTP as above. Documentation of debris removal is made on Form D-2 "Water Removal Report from Dike Tank Farm Containment" in Appendix D.

d) Water level of 3" or more above pump sump and visible signs of oil requires immediately notification to the Manager, Engineering and/or Department Head, Utilities. One or both of them will proceed to the containment area to observe the situation and either stay until this condition is remedied or the steps to be taken in correcting the condition and final disposal of oil. Oil must be skimmed off and deposited in containers for disposal in the Oily Water Separator. Once all signs of oil are removed the remaining water can be pumped to the WWTP as per above for treatment. The incident will be documented on Form D-4; "Oil Removal Report from Dike Tank Farm Containment" included in Appendix D.

e) All oil will be transported to the Oily Water Separation and subsequent burning in plant boilers. Water that is separated from the oil mixture will be sent to the WWTP for further treatment. All water whether from the DIKED area or from the Oily Water Separator will be sent to the WasteWater Treatment Plant.

6.1 DRAINAGE OF RAINWATER FROM DIKED AREA

The removal of rainwater consist of pumping the accumulated water from the containment area to the waste water treatment plant as the diagram on Form D-2, "Water Removal report from Dike Tank Farm Containment" located in Appendix D.

6.2 ON SHORE BULK STORAGE

The plant storage area includes four (4) ABOVE GROUND TANKS. The materials of construction and storage conditions are compatible with the oils stored in the tanks. Their use and capacities are described in section 5.0 of this plan. Tank list and diagrams are found in Appendix G of this plan.

6.3 SECONDARY CONTAINMENT CAPACITY

Dike facilities are appropriate to contain an oil spill. The volume of the enclosing walls is sufficient to contain an approximately 120% of the contents of the largest storage tank in the dike area.

6.4 ON-SHORE FACILITY TRANSFER OPERATIONS

6.4.1

EPA Specialist or designate must be present with tank truck driver at all times during unloading operation to ensure:

a) Tank truck has no leak.
b) Tank discharge pipe is inside the containment.
c) Hoses are in good condition.
d) Quick connection couplings are seated firmly.
e) Pump is in good working condition.
f) Control valve is open.

6.4.2

At the end of the unloading operation, EPA Specialist or designate will ensure that:

a) Control valve is closed.
b) Pump is turned of the "off" position.
c) Hoses are purged, capped and tank has no leaks

6.4.3

A copy of this plan will be distributed to all personnel directed involved in the exercise of unloading distributing/storage and delivery of fuel oil and Soya bean oil.

6.5 ABOVE GROUND TANKS AND DIKE INTEGRITY

6.5.1

Periodic integrity testing and inspection includes visual inspection of tanks, tank valves, interconnecting piping, tank supports and dike walls for tightness. The inspection is completed on a monthly basis by the EPA Specialist and is documented using Form D-3, "Visual Report for Tank Farm Containment Area" in Appendix D.

6.5.2

The exterior portion of the tank(s) is inspected yearly for signs of corrosion. This is documented on Form D-6, "Visual Inspection Report for Tank Farm Containment Area" in Appendix D.

6.5.3

Inventory control and visual inspection(s) by the EPA Specialist are made prior to each load delivery to prevent overflow of product. The EPA Specialist is the person responsible for checking level of appropriate tank in tank farm, hooking up transfer hoses, starting of pump(s) and reversing this procedure when contents of truck have been successfully deposited in tank. This is documented on Form D-8 titled "Visual Inspection Report for Oil Delivery Monitoring" Located in Appendix D. Continuous monitoring of the transfer operation by the EPA Specialist is mandatory to ensure minimal risk of incident.

6.5.4 ACTION(S) TO BE TAKEN IN THE EVENT OF :

Discharge from transfer equipment or hose(s) tank overfills piping leak, rupture or failure.

a) EPA Specialist will immediately initiate emergency shutdown of transfer operation.
b) EPA Specialist will turn off pump and close the discharge valve and close the facility-receiving valve.
c) For minor spills. The EPA Specialist will deploy oil absorbent pads to contain the spill. The quantity of absorbent pads will be sufficient to clean up the average most probable discharge of 10 gallons.

d) For other emergencies, the EPA Specialist will contact the internal individuals and external organizations outlined in Appendix F of this plan to initiate a complete organizational response.

6.6 SPILL INTO DIKED AREAS AND/OR THE LOADING OR UNLOADING AREAS

The person discovering the spill will immediately call Star-Kist Security, Who in turn will contact the On-Scene-Commander. The On-Scene-Commander will notify the appropriate agencies based on the information available. Refer to the Notification list in the Appendix F for details.

- US COAST GUARD
- AMERICAN SAMOA ENVIRONMENTAL PROTECTION AGENCY
- TEMCO
- NATIONAL RESPONSE CENTER
- AMERICAN SAMOA FIRE DEPARTMENT
- AMERICAN SAMOA PBLIC SAFETY OFFICE (POLICE)

Harbor Refuse Collector and Environmental Service is under contract for any spill event concerning the company(s) facility.

Contact Names:

1. **Frank McCoy**
2. **Edith McCoy**

Telephone No. :

Office : (684) 699-4741
Fax : (684) 699-4740
Mobile: 733-2987
733-1968

Information Required:

- Location
- Material
- Estimated Volume of Release
- Possible Source of Release
- Date of Release
- Time of Release
-

A record of the call for each spill event will be maintained and kept at the security office, Below is an example of the Form.

RECORD OF SPILL

DATE:	
TIME:	
PRODUCT:	
EST. VOLUME:	
CAUSE:	

Corrective Action Taken:

Plans for Preventing Re-Occurrence

6.7 FIRE OR EXPLOSION RELATING TO UNLOADING OPERATIONS

The EPA Specialist will cease transfer operations immediately and report the fire to the security guards at the nearest security gate. If the fire is in the incipient stage the appropriate fire extinguisher will be used to extinguish the fire. Fires that are other than incipient must be responded to by the fire department. General evacuation is handled carefully due to the close proximity of the truck unloading area to the planned evacuation route. It is paramount that accurate information be given to management in advance of sounding the general alarm.

In the event of an explosion the EPA Specialist will immediately cease all unloading operations and report the explosion to the security guard at the nearest security gate. General evacuation procedures are to be initiated carefully due to the planned evacuation route being in close proximity to the unloading area. Accurate information is essential early on to allow management to decide on possible deviations from the norm. If there should be a resulting fire refer to above preceding section.

6.7.1 GOVERNMENT AGENCY NOTIFICATION (Notification Procedure)

Based on the information received the On-Scene-Commander will notify the appropriate government agencies.

The government agencies to be notified are as follows:

- TEMCO
- Fire Department
- Police Department
- ASEPA
- National Response Center

Specific notification agencies and there contact numbers are found in Appendix F.

The EPA Specialist requires that in the event of an unauthorized release of a "reportable quantity" of hazardous materials, the National Response Center should be notified immediately. Consult the Critical Operations Team Leader for clarification on "reportable quantity" information at Star-Kist Samoa, Inc.

6.8 SPILL INCIDENT REPORT

6.8.1 INCIDENT SUMMARY

Upon completion of the emergency response to a discharge/release, the Critical Operations Team Leader will file an Incident Investigation-SPCC-Incident Summary and distribute the report to the Emergency Response Organization for review at the critique meeting. This document is found in Appendix H.

6.8.2 SPILL REPORT ROUTING PROCEDURE

For releases of oil products to land or navigable waters any person in charge of a shore facility or vessel must:

a) As soon as he/she has knowledge of any discharge of oil from the vessel or facility in which the amount may violate applicable water or land environment standards; or cause a sludge or emulsion to be deposited beneath the surface of the water on land or adjoining surfaces, shall notify the National response Center and the local United States Coast Guard Office. Refer to Appendix F for a list of telephone numbers.

b) In addition to notifying the National Response Center and Local United States Coast Guard, if the discharge is greater than 1,000 gallons in a single spill event, oil is discharged in two reportable spills within (12) twelve months, the owner or operator must submit a written report to the EPA Regional Administrator within sixty (60) days. This report must contain the following information:

- Name of facility
- Name of owner or operator of facility
- Location of facility
- Date and year of initial facility operation
- Maximum storage or handling capacity of the facility

- Description of the facility: including maps flow diagrams, and topographical maps
- A complete copy of the SPCC plan with amendments
- The Cause(s) of such spill, including a failure analysis of system or subsystem in which the failure occurred.
- The corrective actions and/or countermeasures taken, including an adequate description of equipment repairs and/or replacements.
- Additional preventive measures taken or contemplated to minimize the possibility of re-occurrence.
- Such other information as the Regional Administrator may reasonably require.

6.8.3 WRITTEN SPILL REPORT

After a review of the investigation by the On-Scene-Commander the final report will be filed within thirty days after the spill, at the time, the cause of the incident will have been determined and remedial action planned. If for reason this report cannot be filed within the period mentioned above, a "preliminary report" must be written which will be suspended by the final report not later than sixty (60) days after the spill incident. The Star-Kist Samoa, Inc. On-Scene-Commander prior to filing, must review all reports.

6.9 RESPONSIBILITIES OF THE FACILITY OWNER TO MITIGATE AN AVERAGE MOST PROBABLE DISCHARGE

The Designated Person(s) in Charge (DPIC) are listed in section 2 of this plan. These individuals will delegate the DPIC duties to those team members performing the task(s)truck drivers, transfer operators.

It is the responsibility of the EPA Specialist to ensure that all equipment used in the transfer operation meets the requirements of 33 CFR 155.

It is the responsibility of the EPA Specialist to ensure that a sufficient quantity of oil absorbent pads or booms is on hand to clean up to 10 gallons of discharged product.

6.10 FACILITY SECURITY AND LIGHTING

A. SECURITY

1. Star-Kist Samoa, Inc. maintains 24-hour security personnel at all gates encompassing the Star-Kist Samoa, which includes the facility storage areas.

2. A six-foot (6') high metal chain link fence secures the facility storage areas with entry gates(s) along the hillside road. Gates are locked at times during non-production days or nights and when unattended.

3. Master flow and drain valves that are capable of unauthorized discharge of tank(s) contents to surface waters are securely locked in the closed position when in non-operating or non-standby status.

4. The starter controls on all oil pumps are locked in the "off" position when pumps are in the non-operating or non-standby status.

B. LIGHTING

Star-Kist Samoa facility lighting is located so as provide the facility storage area with consideration to:

1. Discovery of spills occurring during hours of darkness by Star-Kist personnel, the general public or emergency agency personnel i.e. police/fire etc.

2. Prevention of vandalism.

7. INSPECTION AND RECORDS

7.0 INSPECTION

a) The EPA Specialist on a daily basis will perform visual inspection of tanks and associated equipment. Documentation of these inspections is made on Form D-1 title " Visual Inspection Report for Tank Farm Containment Area " in Appendix D.

b) During Non-Production periods the security personnel will visually inspect the storage areas at the facilities and document these inspection included on Form D-1 title " Visual Inspection Report for Tank farm Containment Area " in Appendix D.

c) The EPA Specialist, who has primary responsibility for the storage area, will conduct a monthly inspection of the area and maintain records of such inspection for period of three (3) years. The Utilities Supervisor will be present during the monthly inspection and sign off the inspection sheet. Documentation of this inspection is made using Form D-3 title "Monthly Visual Inspection Report for Tank Farm Containment Area" included in Appendix D.

7.1 RECORDS

a) Inspection forms will be filled out and kept at the facility for period of three (3) years. Refer to Appendix D for inspection from examples.
b) Records of inspection will be forwarded to the Department Head, Utilities for review. The EPA Specialist will keep the Inspection Records.
c) During an inspection, the EPA Specialist or any inspector upon noticing a leak or rupture to the security guard at the nearest security gate who will notify the On-Scene-Commander. The On-Scene-Commander will notify the appropriate agencies based on the information available.

Refer to the Notification List in Appendix F for more information details.

7.2 INSPECTION FORM(S)

- Daily Visual Inspection Report for Dike Tank Farm Containment Area (Form D-1)
- Water Removal Report for Dike Tank Farm Containment Area (Form D-2)
- Monthly Visual Inspection Report for Dike tank Farm Containment Area (Form D-3)
- Oil Removal report for Dike tank farm Containment Area (Form D-4
- Oily water Separator Inspection Report (Form D-5)
- Yearly Visual Inspection Report for Dike tank Farm Containment Area (Form D-6)
- Record of Inspection by Outside Agencies (Form D-7)
- Visual Inspection Report/Checklist for Oil Delivery Monitoring (Form D-8)

8.0 PERSONNEL TRAINING

8.1 TRAININGS

a) Appropriate training is provided to each individual with responsibilities under this plan. All response personnel are trained to meet Occupational Safety and Health Administration (OSHA) standards for emergency response operation contained in 29 CFR 1910. 120, as well as applicable Federal and Territorial Regulations.

* Critical Operations Team Leader	40 hours.
* Critical Operations Response Team Leader	40 hours
* Hazmat Technician	40 hours
* EPA Specialist	24 hours
* Utilities Safety Champion	24 hours
* Security Guards	24 hours

b) EPA specialist will instruct and train operating personnel in the operation and maintenance of spill prevention equipment, notification procedures, shutdown procedures and regulations.
c) Spill Prevention Training Drills for Critical Operations Team Members will be conducted annually to assure adequate personnel training.
d) See Appendix A for Documentation of Training.

Note:

Safety and Health Department is responsible in conducting and handling all the necessary document pertaining the Hazwoper Training.

SPCC PLAN APPENDIX (A)

SPECIALIST

NAME	TRAINING	DATE	AREA
Lance Ihaka	40 hours Hazwoper	10/10/2000	Manager,Engineering
Joe Carney	40 hours Hazwoper	10/10/2000	Dept. Head, Utilities
Eric Johanson	40 hours Hazwoper	10/10/2000	Supervisor, Utilities
Emmanuel Bernal	40 hours Hazwoper	10/10/2000	Lead Specialist, Utilities
Alosio Tominiko	40 hours Hazwoper	10/10/2000	Lead Specialist, Utilities

TECHNICIANS

Vaifi Sautia	24 hours Hazwoper	10/10/2000	Welder Mechanic, UT
Aiveve Passi	24 hours Hazwoper	10/10/2000	Welder Mechanic, UT
Ieremia Manu	24 hours Hazwoper	10/10/2000	Welder Mechanic, UT
Joe Tavai	24 hours Hazwoper	10/10/2000	Welder Mechanic, UT
Losanto Centeno	24 hours Hazwoper	10/10/2000	Lead Specialist, UT
Mata Senerivi	24 hours Hazwoper	10/10/2000	Operator, Compressor
Mike Pulea	24 hours Hazwoper	10/10/2000	Operator, Boiler
Albert Mallari	24 hours Hazwoper	10/10/2000	Lead Man, WWT
Michael Faikoia	24 hours Hazwoper	10/10/2000	Operator, Compressor

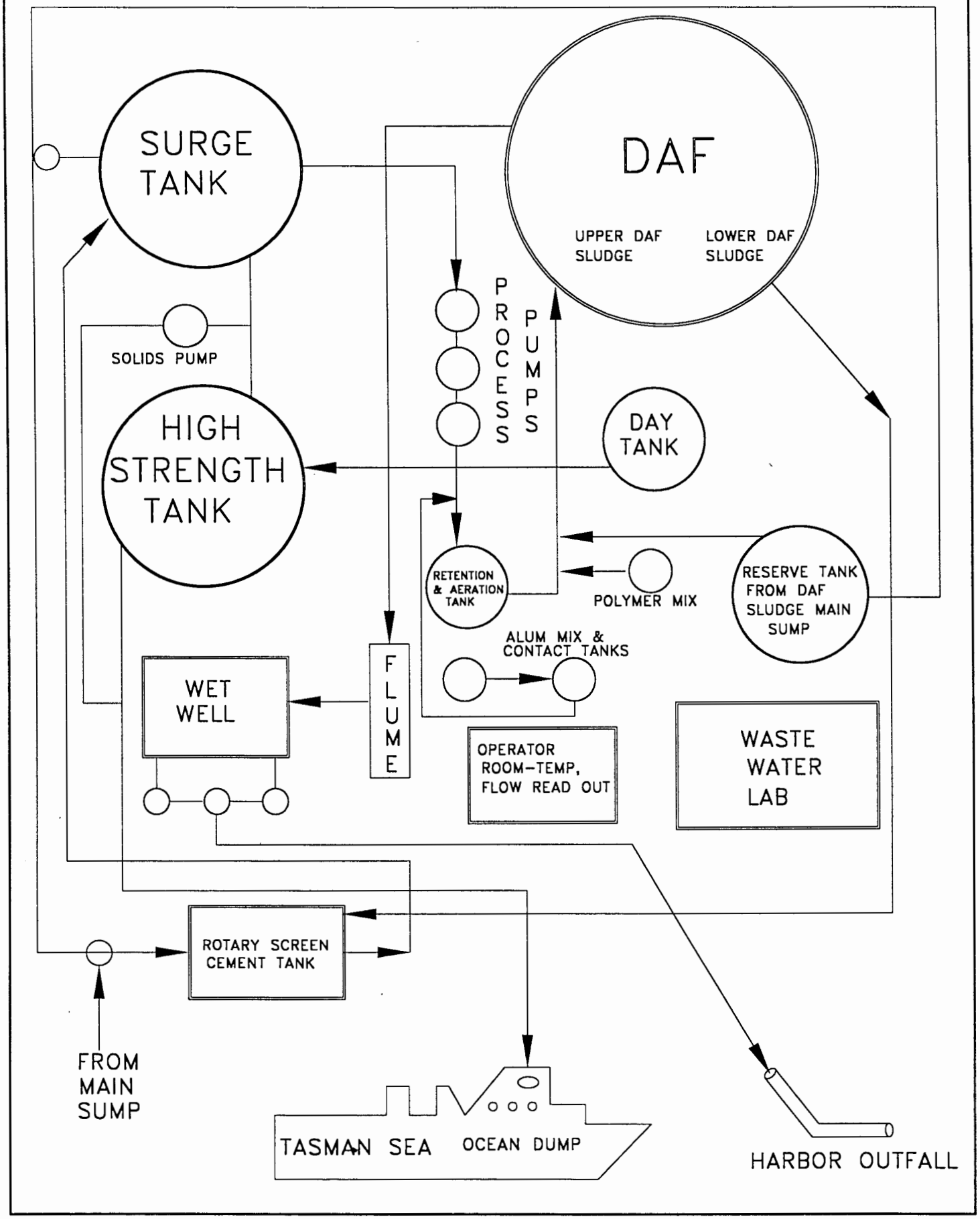
Leapeni Kaufusi	24 hours Hazwoper	10/10/2000	Operator, WWT
Tevesi Toia	24 hours Hazwoper	10/10/2000	Operator, WWT
Peato Tominiko	40 hours Hazwoper	10/10/2000	Operator, Boiler Rm.
Tavita Pesaleli	24 hours Hazwoper	10/10/2000	Operator, Boiler Rm.
Poasa Lisala	24 hours Hazwoper	10/10/2000	Welder Mechanic, UT
Enoka Fotuali'I	24 hours Hazwoper	10/10/2000	Welder Mechanic, UT
Apelu Ualesi	24 hours Hazwoper	10/10/2000	Painter
Patireti Lefaoseu	24 hours Hazwoper	10/10/2000	Operator, Compressor
Vaela'a Apisala	24 hours Hazwoper	10/10/2000	Operator, Compressor
Peniamina Sini	24 hours Hazwoper	10/10/2000	Operator, WWT
Papatea Sailiata	24 hours Hazwoper	10/10/2000	Operator, Compressor
Fa'atea Liutoa	24 hours Hazwoper	10/10/2000	Operator, Compressor
Ta'ase Malaulu	24 hours Hazwoper	10/10/2000	Operator, WWT
Theresa Pastorfide	24 hours Hazwoper	10/10/2000	EPA Specialist

NOTE:
The Safety and Health Department is responsible in keeping all the documents pertaining the Hazwoper Training.

Contact Persons:

1. Sonny Thompson	**Manager, Safety & Health**
2. Ali'I Failauga	**Supervisor, Safety & Health**
3. Ricky Tavu'I	**Safety Champion, UT**

STARKIST WASTE WATER TREATMENT & DISPOSAL PROCESS



StarKist Samoa, Inc.

September. 2000

SPCC PLAN APPENDIX (C)

(Harbor Refuse and Environmental Services Equipment)

Average Most Probable Discharge Response:

*	Sorbent Boom	4 Bales
*	Sorbent Pads	100 Bales
*	100' Sorbent Sweeps	100 Bales
*	Flatbed Response Truck	
*	Pick-up Response Truck	
*	Vaccum Pump	1000 Gallons Capacity

Worst Case Scenario

*	40' Marine Vessel	
*	12' Aluminum Skiff	
*	1000 Sorbent Booms	
*	Tank Truck	(3800 gallons capacity)
*	Potable Bladders	(3500 gallons capacity)
*	Air Compressor	
*	CB	2
*	Portable Water Pumps	4
*	Diaphragm Pumps	5
*	Connect Hoses for Pumps	Above>1000'

SPCC PLAN APPENDIX (D)

FORM D-1

Star-Kist Samoa, Inc.
Visual Inspection Report for Tank Farm Containment Area

DAILY

Date	Dike Condition	Liquid Level Containment	Security of Tank	Security of Pipe Fitting	Pump unit	DPIC Sign	Security Sign

Guidelines:
S- Satisfactory Condition
O- Repair or Adjustment Required
N/A- Not Applicable
C- See Additional Comments

* DPIC signs on production days and security guard signs on non-production days.

Additional Comments:

SPCC PLAN APPENDIX (D)

FORM D-2

Star-Kist Samoa, Inc.
Water Removal Report from Dike Tank Farm Containment

AS REQUIRED

Date	Sump H2O Level	Oil Present Yes/No	Time Pump Started	Time Pump Stopped	Est. # Gallons Removed	Operator Signature	EPA Specialist Signature

Additional Comments

SPCC PLAN APPENDIX (D)

FORM D-3

Star-Kist Samoa, Inc.
Visual Report for Tank farm Containment Area

Monthly

Date	Dike Condition	Liquid level Containment	Security of tanks	Security of Pipe & Fitting	Pump Unit	Fence Gate Check	Vegetation Check	EPA Specialist	Utilities Supervisor

Guidelines:
S- Satisfactory Condition
O- Repair or Adjustment Required
N/A- Not Applicable
C- See Additional Comments

Additional Comments:

SPCC PLAN APPENDIX (D)

FORM D-4

Star-Kist Samoa, Inc.
Oil Removal Report from Dike Tank Farm Containment

AS REQUIRED

Date	Sump Level	Surface Oil Thickness	Est. # Gal. Removed	Gals. Rec. in O.W.S.	Sump Condition Clean/Secure	EPA Specialist	Utilities Supervisor Signature

Additional Comments:

SPCC PLAN APPENDIX (D)

FORM D-5

Star-Kist Samoa, Inc.
Inspection Report for Oil Water Separator

Monthly

Date	Tank Level	Gal. Oil for Process	Cleanliness of Area Yes/Not	Electrically Ready for Operation	Boiler operator	EPA Specialist

Additional Comments:

SPCC PLAN APPENDIX (D)

FORM D-6

Star-Kist Samoa, Inc.
Visual Inspection Checklist for Tank Farm Containment Area

YEARLY

Date: _____ Time: _____ Inspector: _____	Guidelines: S- Satisfactory Condition O- Repair or Adjustment Required N/A- Not Applicable C- See Additional Comments

_____ * Dike area check for crack.

_____ * Drain Valves check for tightness and flow ability.

_____ * Tanks check for signs of corrosion or cracking of seams, flange and flange gasket for tightness.

_____ * Pump and motor unit check for vibration and unusual noises.

_____ * All lighting fixtures check for operation and capability of proper illumination of area.

_____ * Vegetation should be cropped short in proximity of the containment area.

_____ * Fence and gates enclosing the area are intact.

_____ * Gates have locks.

Additional Comments:

_____

_____

_____

SPCC PLAN APPENDIX (D)

FORMD-7

RECORD OF INSPECTIONS BY OUTSIDE AGENCIES

DATE: _____

US COAST GUARD ☐

ASEPA ☐

AS PUBLIC SAFETY DEPT. ☐

AS PORT AUTHORITY ☐

AS FIRE DEPT. ☐

INSPECTION POINTS	PASS	FAIL	OTHER
STORAGE DIKE			
DIKE			
PIPING			
FLANGES			
PUMP UNIT			
VEGETATION			
FENCED ENCLOSURE			
HOUSEKEEPING			

SPCCPLAN APPEDIX (D)

FORM D-8

Star-Kist Samoa, Inc.
Visual Inspection report/Checklist for Oil Delivery Monitoring

DATE: _____
TIME: _____
INSPECTOR: _____

GUIDELINES:
X- Satisfactory
N/A- Not Applicable
O- Repaired or Adjustment required
C- See Comment under Remarks/Recommendation

TANK FARM:

_____ Level of the appropriate content of the tank.

PIPE LINE :

_____ No sign of corrosion damage to pipeline or support.
_____ No leaks of valves, flanges or other fittings.
_____ Signs/barriers to protect pipelines from vehicles in place.

TRUCK LOADING/UNLOADING AREA:

_____ No water in the containment area.
_____ Tank truck has no leak.
_____ Warning signs were posted.
_____ Tank discharge pipe is inside the containment area.
_____ Hoses are in good condition: no Leaks.
_____ Quick connection coupling are seated firmly.
_____ Pump is in good working condition; no clogged.
_____ Control valve is open.

END OF UNLOADING OPERATION:

_____ Control valve is closed.
_____ Pump is turned off the "off" position.
_____ Hoses are purged capped and tank has no leaks.
_____ Cleaned the area.

REMARKS/RECOMMENDATIONS:

SPCC PLAN APPENDIX (E)

RECORD OF NOTIFICATION AND INSPECTIONS

1. UNITED STATE COAST GUARD
   Name: _____
   Date : _____
   Time : _____

Comments:

2. AMERICAN SAMOA ENVIRONMENTAL PROTECTION AGENCY
   Name : _____
   Date : _____
   Time : _____

Comments:

3. AMERICAN SAMOA POWER AUTHORITY
   Name : _____
   Date : _____
   Time : _____

Comments:

4. AMERICAN SAMOA FIRE DEPARTMENT
   Name : _____
   Date : _____
   Time : _____

Comments:

5. AMERICAN SAMOA PUBLIC SAFETY DEPARTMENT (POLICE)

Name : _____
Date : _____
Time : _____

Comments:

6. NATIONAL RESPONSE CENTER

Name : _____
Date : _____
Time : _____

Comments:

SPCC PLAN APPENDIX (F)

NOTIFICATION TELEPHONE NUMBERS EXTERNAL

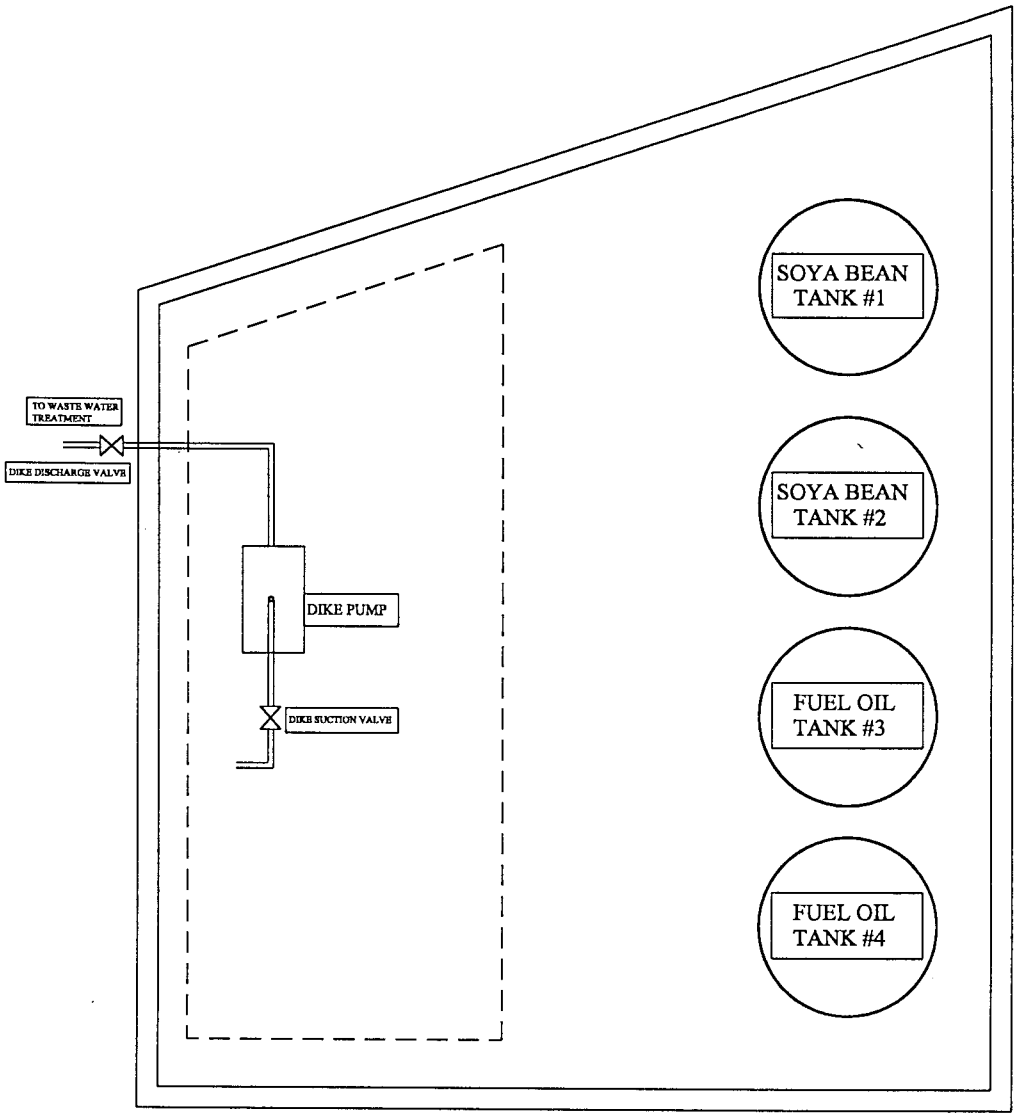
TEMCO	699-6482
US COAST GUARD	633-2299
US COAST GUARD MSD CELLULAR	258-7001,258-7002,258-7003
US COAST GUARD MSD FACSIMILE	(684) 633-1933
US COAST GUARD MSO HONOLULU FAX PORT OPS	(808) 541-2068
US COAST GUARD MSO HONOLULU INSP	(808) 541-3154
ENVIRONMENTAL PROTECTION AGENCY	633-2304 OR 633-5801
FIRE DEPARTMENT	911
POLICE DEPARTMENT	911
AMBULANCE	911
HARBOR REFUGE &ENVIRONMENTAL PHONE#	699-4741
HARBOR REFUGE & ENVIRONMENTAL FAX#	(684) 699-4740
HARBOR REFUGE & ENVIRONMENTAL CELLULAR#	733-1968,733-1988
NATIONAL RESPONSE CENTER	800-424-8802
PUBLIC SAFETY	633-1111

NOTIFICATION TELEPHONE NUMBERS: INTERNAL

Phil Thirkell/General Manager	Business	644-4231 ext. 311 or 327
ON-SCENE-COMMANDER	Home	644-1324
	Cellular	258-4211
Lance Ihaka/Manager Engineering	Business	(684) 644-4231 ext. 362
EMERGENCY RESPONSE COORDINATOR	Home	699-4410
	Cellular	258-3234
Sonny Thompson/Manger Safety & Health	Business	(684) 644-4231 ext. 425
SAFETY & HEALTH TEAM LEADER	Home	644-1343
	Cellular	(684) 733-2384
Joe Carney/ Dept. Head Utilities	Business	(684) 644-4231 ext. 354
CRITICAL OPERATIONS TEAM LEADER	Home	699-4355
	Cellular	733-1819
Ed Harmon/ Dept. Head Gen. Maintenance	Business	(684) 644-4231 ext. 360
SUPPORT TEAM LEADER	Home	699-2898
	Cellular	733-1086

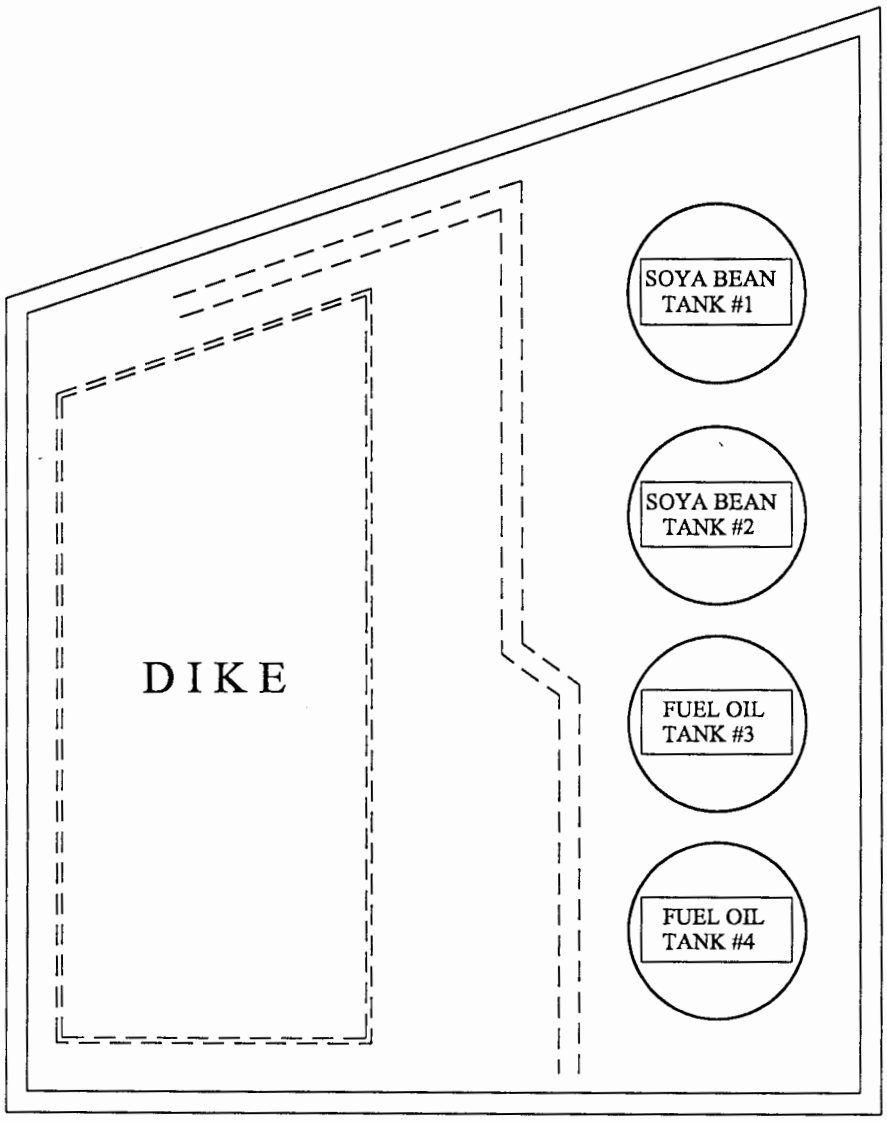
SPCC PLAN APPENDIX [G]

G - 1



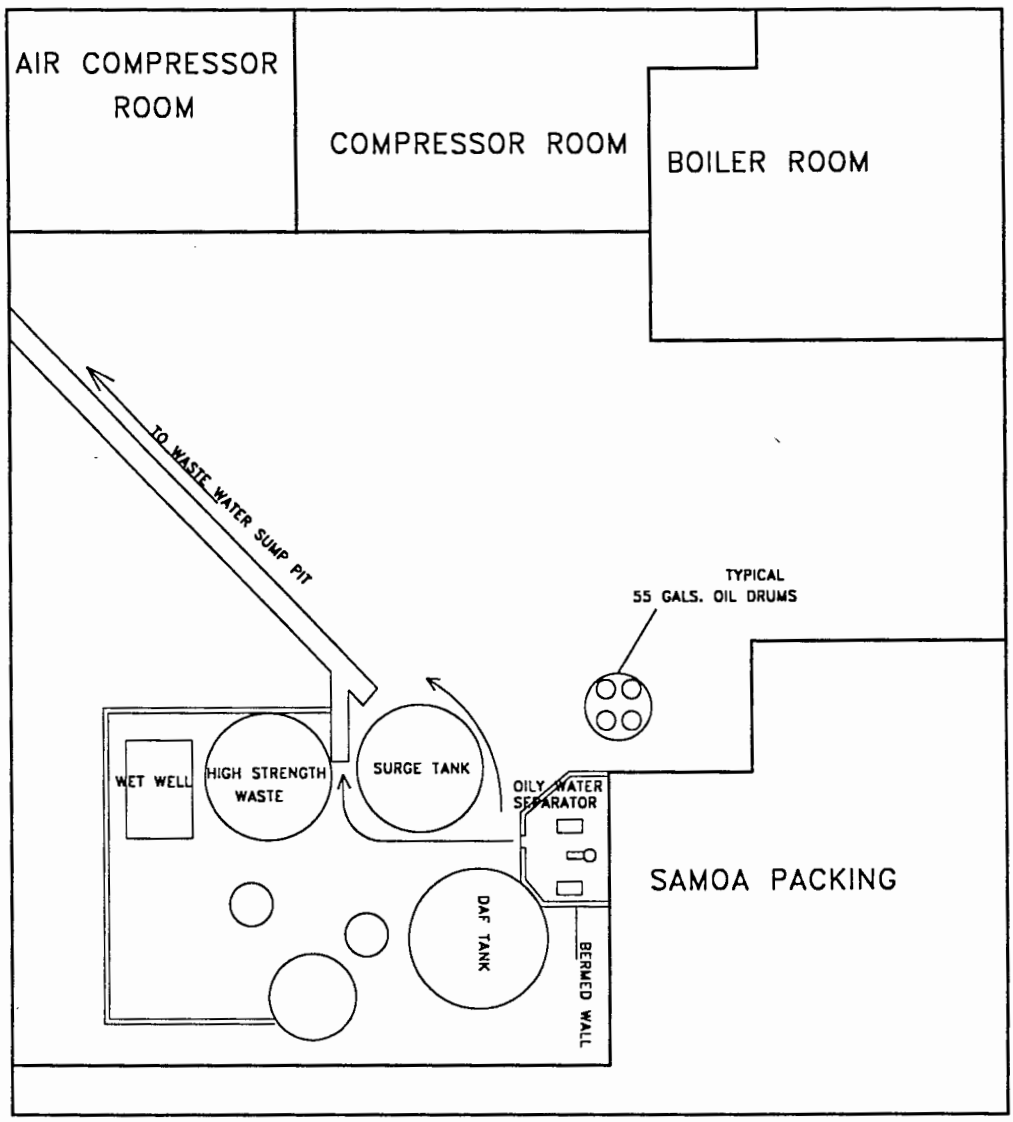
DIKE STORAGE AREA

SPCC PLAN APPENDIX [G]



DIKE STORAGE AREA

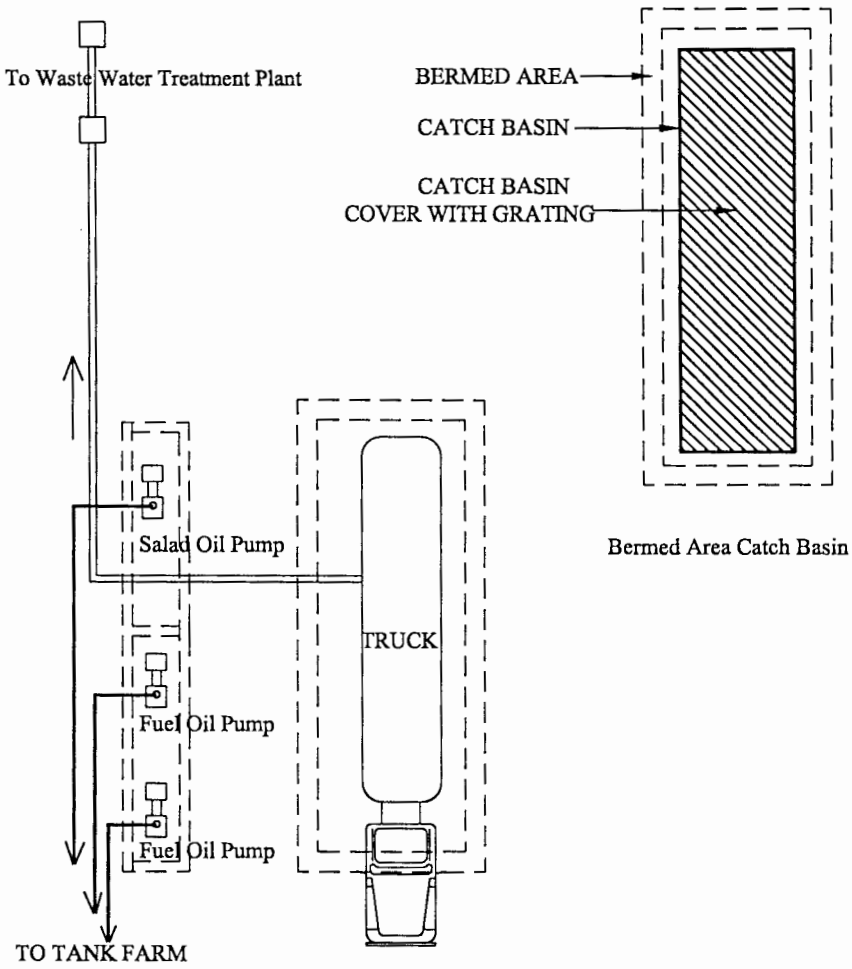
SPCC PLAN APPENDIX [G]



OILY WATER SEPARATOR

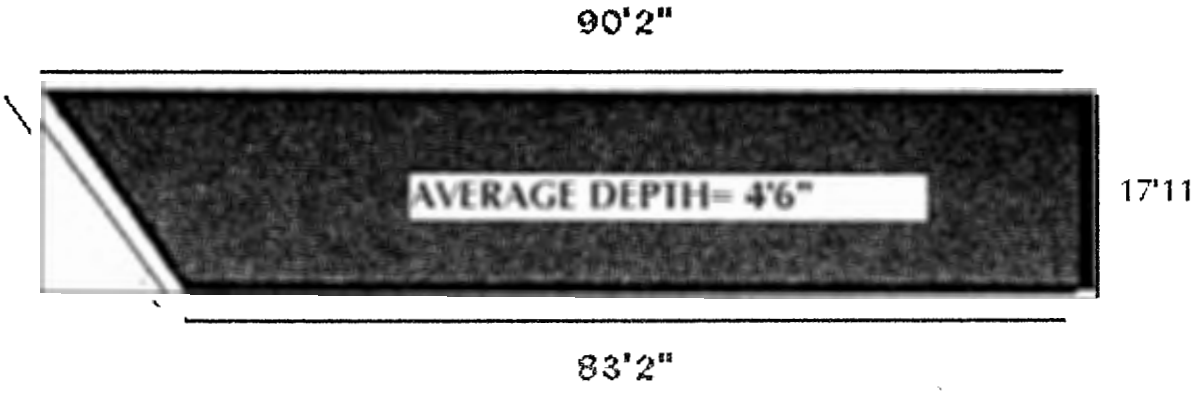
SPCC PLAN APPENDIX [G]

G - 4



SOYA BEAN & FUEL OIL UNLOADING AREA

SPCC PLAN APPENDIX G
CONTAINMENT AREA
AREA, VOLUME & CAPACITY CALCULATION



DIKE SPECIFICATION:

DEPTH - 4'6" = 4.5 ft.
WIDTH - 17'11" = 17.9ft.
LENGTH -
(LONGEST) - 90'2" = 90.17ft.
(SHORTEST) - 83'2" = 83.17ft.

DIKE'S AREA:

(PARTIAL- RECTANGULAR)

LENGHT X WIDTH= DIKE'S AREA
83.17ft. x 17.9ft. = 1488.74 ft.

(PARTIAL- ANGULAR)

$$\frac{\text{LENGHT X WIDTH}}{2} = \text{DIKE'S AREA}$$

$$\frac{17.9\text{ft} \times 7\text{ft}}{2} = 62.65\text{ft}$$

TOTAL DIKE AREA

RECTANGULAR + ANGULAR
1488.74ft + 62.65fT = 1551.39 sq.ft

DIKE VOLUME:

DIKE AREA X DEPTH
1551.39 sq.ft. X 4.5ft. = 6981.255 cubic ft.

DIKE CAPACITY:

DIKE VOLUME X 7.48 gal/cu.ft.
6981.255 cu.ft. X 7.48 gal/cu.ft. = 52,219.79 gallons or
52,220 gallons

SPCC PLAN APPENDIX (H)

FORMIIR-IA **REFERENCE NO. _____**

INCIDENT INVESTIGATION-SPCC PLAN
INCIDENT SUMMARY

Facility Information: Date of Incident: / /

Name: Star-Kist Samoa, Inc.	SIC Code:
Address: Pago Pago, American Samoa 96799	

Incident Type (Check any that apply):

☐ Near- Miss	☐ Pump Malfunction	☐ Dike Crack/Failure
☐ Leaking Tank/Fitting/Pipe	☐ Fire/Explosion	☐ Others

Primary Source of Release (Check One):

☐ Rupture Hose	☐ Dike Crack/Malfunction	☐ Operator
☐ Rupture Tank	☐ Piping Failure	☐ Tank Overflow
☐ Evaporator	☐ Valve Malfunction	☐ Others

Cause(s) Contributing to Release (Check any that apply):

☐ Human Factors	☐ Equipment Defect/Malfunction	☐ Control Failure
☐ Design Shortcoming	☐ Improper Installation	☐ Process Upset
☐ Misapplied Equipment	☐ Mechanical Damage	☐ Other Emergency
☐ Power Failure	☐ Hydrostatic Expansion	☐ System Change
☐ Corrosion	☐ Hydraulic Shock	☐ Maintenance Activity
☐ Inadequate Maintenance	☐ Inadequate Administrative Controls	☐ Inadequate labeling
☐ Earthquake		

Types of Changes Recommended to Prevent Recurrence (Check any that apply):

ADMINISTRATIVE	ENGINEERING
☐ Operating Procedures	☐ Design
☐ Additional Training	☐ Equipment
☐ Emergency Response Procedure	☐ Piping
☐ Safe Work Practice	☐ Safety equipment
☐ Labeling/ Identification	☐ Maintenance Activity
☐ Maintenance Procedures	☐ Controls
☐ Management of Changes Procedures	

Result of Incident (Provide Requested Information)

Total Quantity Release:
Estimate of Property/Product Damages:
Number of Serious Injuries:
Number of Fatalities:

SPCC PLAN APPENDIX (H)

FORM IIR-IB **REFERENCE NO. _____**

INCIDENT INVESTIGATION SPCC-PLAN
INCIDENT DESCRIPTION

LOCATION : _____
DATE : _____
TIME : _____
DURATION OF INCIDENT: _____

CIRCUMSTANCES LEADING UP TO INCIDENT:

_____
_____
_____
_____
_____
_____
_____

EVENTS AND ACTIONS AS INCIDENT UNFOLDED:

_____
_____
_____
_____
_____
_____
_____
_____

SPCC PLAN APPENDIX (H)

FORMIIR-IC **REFERENCE NO._____**

INCIDENT INVESTIGATION SPCC-PLAN
INCIDENT CAUSE

INVESTIGATION TEAM'S ASSESSMENT OF ROOT CAUSE OF INCIDENT:

_____
_____
_____
_____
_____
_____
_____

INVESTIGATION TEAM'S ASSESSMENT OF ADDITIONAL CONTRIBUTING CAUSE:

_____
_____
_____
_____
_____
_____
_____

ACTIONS OR CIRCUMSTANCES WHICH EITHER HELPED TO MINIMIZE THE EFFECT OF THE INCIDENT OR WHICH COULD HAVE MINIMIZED THE EFFECT:

_____
_____
_____
_____
_____
_____

SPCC PLAN APPENDIX (H)

FORMIIR-ID **REFERENCE NO. _____**

INCIDENT INVESTIGATION SPCC-PLAN APPROVAL, FOLLOW-UP REVIEWS

Date and Time Team Commenced Investigation: _____

Team Membership (List Team Leader First):

NAME	TITLE	COMPANY	APPROVAL

Location of Team's Working and Support Documents:

Recommended Changes:

MCF Ref. No.	Description of Changes

Recommended Employee Reviews Report:

Copy Distribution:
DOC File ID:

Submitted By: _____ _____
Name Date

_____ _____
Signature Title

Received By: _____ _____
Name Date

_____ _____
Signature Title

SPCC PLAN APPENDIX (H)

FORM IIR-2A **REFERENCE NO. _____**

INCIDENT INVESTIGATION SPCC-PLAN CLOSE-OUT

Description of Incident:

Investigation review Sessions:

Hazard Reduction Actions:

Copy Distribution:
DOC> File ID:

Submitted By: _____ _____
Name Date

_____ _____
Signature Title

Received By: _____ _____
Name Date

_____ _____
Signature Title

SPCC PLAN APPENDIX (I-1)

Star-Kist Samoa, Inc.
Mechanical Integrity Program for Oil Storage System (Components)

There are four (4) tanks in total and are located on the hillside across the road from the plant. These tanks are identified in Appendix G noted as Dike Storage Area.

These tanks will be inspected every five (5) years both internally and externally. The purpose of this inspection is to ensure continuity of operation and prevent unexpected release of oil to the environment.

THE FOLLOWING WILL BE CHECKED:

⇒ All flanges on the tanks checked for evidence of leaks/drips, missing bolts or nuts and proper fit-up.
⇒ All valves to be checked for freedom of movement and signs of leakage. Evidence of leakage such as drips, stains etc. will be investigated thoroughly and will necessitate removal and dismantling the valve.
⇒ Tanks will be emptied and thickness test will be taken at quadrants around the tanks. These readings will be documented and compared to original specs. Reading that shows erosion of metal exceeding 30% of original specs will necessitate removal of the tank from service immediately and repairs carried out to bring the tank back to original specs.
⇒ Piping to and from tanks to be thickness tested every five (5) years. This piping is graphically represented in drawings labeled: **STAR-KIST SAMOA PLANT LAYOUT (Figure 1) and the two (2) pump units illustrated in Appendix G.** Documentation of the inspection is located in Appendix I-6, named Mechanical Integrity Program for Oil Storage System (Components)
⇒ Hoses are used to deliver oil from the tanker to pumping unit for final destination at the farm across from the plant. These hoses will be checked once per year for cracks, tears, gouges, and blisters in the cover. If any of the conditions above are noted the hose be taken out of service and replaced with a new one of proper type. Documentation of hose inspection is located in Appendix I-5 named "Mechanical Integrity Program for Oil Storage System (Components).
⇒ Work Orders are to be generated for all work carried out relating to failure of any item inspected by the operator and will be file in the Engineering Department by EPA Specialist.

SPCC PLAN APPENDIX (I-2)

Star-Kist Samoa, Inc.
Mechanical Integrity Program for Oil Storage System (Components)

Purpose:

To prevent unexpected releases of fuel/process oil to the environment from the unloading / loading / distribution / storage components of Star-Kist Samoa, Inc.

Scope:

This applies to the erection, installation, repair, replacement and maintenance of the components below:

- Tank
- Pumps
- Valves
- Pipes
- Fittings
- Hoses

Inspection Program Components:

⇒ **Inventory**
Total number of items to be inspected. Where applicable these items will be groped by type i.e.: tanks will be grouped into one category but identified individually. Likewise valves, pumps etc.

⇒ **Pass/Fail Criteria**
Identifies each critical component that must be examined and describes what is considered out of limits. Refer to Appendix I-5 title, " Mechanical Integrity Program for Oil Storage System (Components) Hose Inspection Record".

⇒ **Frequency**
Tells how often a component must be inspected.

⇒ **Inspect Findings**
Identifies equipment that failed and explains what caused the failure. Refer to Appendix I-6 Title, " Mechanical Integrity Program for Oil Storage System (Components).

SPCC PLAN APPENDIX (I-3)

Star-Kist Samoa, Inc.
Mechanical Integrity Program for Oil Storage System (Components)

Dike Area

DATE	DIKE WALL INTACT & NO SEEPAGE	DRAIN VALVES VISIBLE	CEMENT FLOOR INTACT/NO CRACKS	INSPECTOR SIGNATURE

Note: Work orders to be developed covering all repairs associated with failure of any items.

SPCC PLAN APPENDIX (I-4)

Star-Kist Samoa, Inc.
Mechanical Integrity Program for Oil Storage System (Components)

Pipe/Valve/Fitting Inspection Records

DATE	SIZE OF PIPE &LOCATION	VALVE FITTING/ID LOCATION	DESIGN THICKNESS	ACTUAL THICKNESS	METHOD OF TEST	OPERATOR

NOTE: Work Order to be developed covering all repairs associated with failure of any item.

SPCC PLAN APPENDIX (I-5)

Star-Kist Samoa, Inc.
Mechanical Integrity Program for Oil Storage System (Components)

Hose Inspection Record
Transfer Hose for Fuel Oil

Once a Year
(October)

Date: _____/_____/_____

Hose Inspected For:

Blister	Cracks	Cuts	Tears	Gouges
Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail
☐/ ☐	☐/ ☐	☐/ ☐	☐ / ☐	☐/ ☐

Hose Inspection Record

Transfer Hose for Soya Oil

Date: _____/_____/_____

Hose Inspected For:

Blister	Cracks	Cuts	Tears	Gouges
Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail	Pass/Fail
☐/ ☐	☐/ ☐	☐ / ☐	☐ / ☐	☐ / ☐

NOTE: **Hoses that fail any of the above will necessitate replacement.**

SPCC PLAN APPENDIX (I-6)

Star-Kist Samoa, Inc.
Mechanical Integrity Program for Oil Storage System (Components)

There are two (2) pump units associated with the oil storage system. These pump units are identified in Appendix G in the drawing for Dike Storage Area and Soya Bean & Fuel Oil Unloading Area.

These pump units will be dismantled and checked internal every five (5) years. All worn out parts will be replaced. All connection nipples and hoses will be replaced and replacement will be documented.

Pump Unit Inspection Record:

DATE	LOCATION OF PUMP	FINDINGS	PASS/FAIL	SIGNATURE

NOTE: Work order will be developed covering all repairs associated with failure of any item. Work order will be forwarded to the designated department who is responsible in the specific repairs that needed. One copy will be for the department who will repair do the work order and the other copy will be forwarded to the EPA Specialist for filing in the Engineering Department office.